

Vol. 20. No. 10. pp. 625-680

Abstracts 2751-2974

October, 1950



THE VETERINARY BULLETIN

1950

COMMONWEALTH BUREAU OF ANIMAL HEALTH
WEYBRIDGE, SURREY
ENGLAND

Price 5/- net

Annual Subscription £2

Commonwealth Agricultural Bureaux

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THE VETERINARY BULLETIN

Vol. 20]

OCTOBER 1950

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DISEASES CAUSED BY BACTERIA AND FUNGI

SMITH, H. W. (1948.) **The typing of staphylococci of animal origin by the bacteriophage method.**—*J. comp. Path.* 58. 179–188. 2751

Using seven phages of the 42D group, and six of the 29 group, S. was able to type 93.3 % of 1,016 strains of staphylococci isolated from bovine milk samples, a much higher percentage than has been attained in former work. Of these, 83.8 % were susceptible to 42D group phages, and 9.5 % to 29 group phages. Of 200 strains, selected so as to include no more than one strain from any one herd, these percentages were 70 % and 21 %. It is concluded that strains susceptible to 29 group phages occur only sporadically in herds, and in only one herd was this group the predominant type. In two cases two different phage types were isolated from the same milk sample, and because of this and also because phages may undergo a change of type as a result of the action of lysogenic phages of the same group *in vitro*, and possibly *in vivo*, S. concluded that phage-typing may have limitations in the study of bovine mastitis. Phage-typing did not distinguish staphylococci from the udders of cows with mastitis from those originating from apparently normal udders.

Three strains of staphylococci, from human cases of "food poisoning", from human mastitis, and from bovine mastitis, were found to be antigenically identical, and were able to maintain themselves in the bovine udder for six weeks. The danger of human infection from bovine sources is stressed.

New phages were prepared to deal with staphylococci of ovine origin, as most of these were insusceptible to the old type phages. Using six phage types, 70.4 % were typed, 20.9 % were partially susceptible to some of the phages, and 8.7 % were completely insusceptible. One of the six types comprised 35.4 % of the total. They are distinct from staphylococci of bovine or human origin.

The staphylococci present on the skin of lambs were similar to those in the lesions of tick pyaemia,

indicating that organisms present on the skin were inoculated into the tissues by the bite of the tick.

—R. M. LOOSMORE.

FOLEY, G. E., & SHWACHMAN, H. (1950.) **Some observations on a streptomycin-dependent strain of *Staphylococcus aureus*.**—*J. gen. Microbiol.* 4. 141–149. [Authors' summary copied *verbatim*.] 2752

Variants whose growth was either dependent upon or enhanced by streptomycin appeared spontaneously during a sensitivity titration of a strain of *Staphylococcus aureus* isolated from a nose and throat culture. In addition to these variants, multiple single colony strains from the original culture exhibited a wide range of susceptibility to streptomycin. The variability after exposure to streptomycin in the laboratory was no greater than that exhibited by the original isolates.

The mechanism by which these variants utilize streptomycin is not yet known. Streptomycin inactivated by semicarbazide or L-cysteine did not support or enhance growth. The acquisition of the ability to utilize streptomycin had no measurable effect on the other biochemical characteristics investigated.

When large inocula of the dependent variant were planted on streptomycin-free agar, a few colonies appeared after prolonged incubation. The cells of such colonies underwent a profound morphologic change not unlike the production of "large bodies" which occurs in several species of bacilli. The progeny of such colonies were of normal morphology and either resistant or susceptible to streptomycin but were no longer dependent on it.

Survival of the variants in chick embryos, except in those instances where mutation occurred, was dependent upon the presence of streptomycin. These variants were mouse avirulent, even in the presence of hog mucin in addition to streptomycin.

STABLEFORTH, A. W. (1950.) **Bovine mastitis with particular regard to eradication of**

Streptococcus agalactiae.—Vet. Rec. 62. 219–224. 2753

This paper deals with work carried out at the Veterinary Laboratory at Weybridge on the course, epidemiology, diagnosis, and therapy of mastitis in dairy cows and the eradication of *Str. agalactiae* infection.

In a recent random survey of herds in two counties in Southern England *Str. agalactiae* was demonstrated in over 60 % of herds and in about 15 % of cows. Similar figures were obtained in Cheshire in 1948. That this incidence is lower than in the past is probably because previous figures were obtained from herds in which mastitis was a problem, rather than from a random sample of herds, and also because of the reduction of infection which has followed the widespread use of penicillin.

A cheap and rapid method for the bacteriological diagnosis of infection has recently been introduced. Samples of milk are taken, usually by the farmer, on to two jars of special medium, which are sent to the laboratory and incubated for two days. Indirect tests for mastitis do not detect early cases or distinguish between different infections and they may be positive in uninfected cows at the beginning or end of lactation.

Penicillin is the most useful drug and two doses of 20,000 units on successive days give about 90 % of clinical cures and sterilize some 70 % of infections, whereas five daily injections of 20–100,000 units sterilize some 90 % of cases, as do three treatments with 100,000 units at intervals of 48 hours.

The treatment of infections by other streptococci and by staphylococci is more difficult. Summer mastitis is often associated with other organisms along with *C. pyogenes*, e.g. *Str. dysgalactiae*, a small streptococcus which is a symbiont on *Str. dysgalactiae*, haemolytic staphylococci, an anaerobic streptococcus, and sometimes even *Str. agalactiae*. Three field trials, each involving 500–1,000 cows, have not provided any evidence that *C. pyogenes* toxoid or a formolized vaccine are useful preventatives.

The treatment of clinical cases of *Str. agalactiae* mastitis reduces the amount of spread within a herd, but involves only about one-third of all the infected cows in the herd. Treatment of all animals found infected on cultural examination is often disappointing in herds in which the incidence of infection is high. In such herds it is best to treat all the animals, and examples are given of the success of this method in a large number of herds. Some workers have recorded a higher incidence of other infections after *Str. agalactiae* has been eradicated, but this has not been the author's experience.

In about 20 % of treated herds there is persistent recurrence of new infections. Some instances are the result of refusal to get rid of a cow which has failed to respond to repeated treatments, others to the presence of teat lesions or to bad sanitary conditions, but a few have no obvious explanation.

In discussion on the paper Berger referred to the high incidence of Group C streptococci in herds in Cheshire. In this county it was found in 1946 that for every case of clinical mastitis caused by *Str. agalactiae* there were two cases caused by other streptococci or by staphylococci. A complete herd test was necessary before attempting to eradicate mastitis so that the extent of infection with organisms other than *Str. agalactiae* could be determined before treatment was begun.

Stableforth mentioned that eradication of *Str. agalactiae* was more difficult in machine-milked herds, especially if the cows were not stripped. Although the disinfection of human skin was extremely difficult, the same did not apply to the skin of cattle, probably because in the latter the organisms present were not the normal skin flora. *Str. agalactiae* could be found before the skin was sprayed with hypochlorite solution and not afterwards.—E. G. WHITE.

SPENCER, G. R., & McNUTT, S. H. (1950.)
Pathogenesis of bovine mastitis. II. The pathologic alterations in twenty-five mammary glands.—*Amer. J. vet. Res.* 11. 188–198.
[Authors' summary copied *verbatim*.] 2754

The pathologic alterations in the mammary glands of 25 dairy cows were correlated with the antemortem, clinical, and bacteriologic findings. In cases of acute mastitis, there was an acute diffuse exudative inflammation, and sometimes extensive necrosis. Mammary glands affected clinically with chronic streptococcic mastitis showed both chronic interstitial and acute focal inflammation. Most of the clinically normal animals which were eliminating streptococci also had focal lesions of chronic interstitial and acute mastitis. Many such glands with no gross abnormalities showed microscopic evidence of inflammation.

Lesions of various ages were present in most affected glands, and there was a gradual progression toward atrophy and fibrosis. The lesions were more extensive and severe in the ventral than in the dorsal portion of the glands. These results indicate that a streptococcic infection usually causes progressive inflammatory lesions in the gland. The roughening of the surface of the epithelium of the milk ducts and the occlusion of ducts by clots of fibrin are probably important in the pathogenesis of bovine mastitis.

ANON. (1949.) **Penicillin in *Str. agalactiae* infection: trials made in Great Britain in 1945 and 1946.**—*Vet. Rec.* 61. 235-237. 2755

This is a report of joint work carried out in six different laboratories. Nearly all penicillin injections were made in 50 ml. of water and all quarters of the udder were treated whether infected or not. Single or repeated doses were given, the total amount of penicillin varying between 10,000-200,000 units. Small repeated doses were more efficient than single large ones. In these experiments the maximum amount of sterilization obtained was about 80 %. Preliminary results indicate that this can be increased by prolonged treatment.—E. EDEN.

RITCHIE, J. N. (1948.) **Bovine tuberculosis.**—*J. R. sanit. Inst.* 68. 503-508. 2756

This is a general account of the incidence and control of bovine TB. in Britain. R. discusses the various measures introduced to control the disease and gives figures for the Tuberculosis (Attested Herds) Scheme at the end of 1947. Separation of young stock from adult animals, and the thorough disinfection of premises occupied by animals subsequently found to be reactors, was the method which accounted for the introduction during 1947 of some 26 % of the herds which were added to the register of attested herds in Scotland. The time to provide authority for compulsory eradication and slaughter of reactors would seem to be the time when area eradication measures are introduced. Eradication of the disease from cattle in Britain is stated to be a practical proposition within a reasonable number of years.

In the discussion R. referred to the difficulty in disposing of tuberculin reactors. Their slaughter would at the present time seriously affect the milk supply, whereas if they were given a distinctive marking they would fetch a lower price than animals sold at the same market and unmarked only because they had not been tuberculin tested.

—E. G. WHITE.

ANON. (1948.) **Incidence and control of tuberculosis. [In Gt. Britain.]** *Vet. Rec.* 60. 302-304. 2757

Five maps of England, Scotland, and Wales are used to illustrate various aspects of the subject. The first illustrates the incidence of reactors to the tuberculin test in the 1938 survey of self-contained herds, the highest incidence then being in areas supplying large towns while the predominantly rural areas had a relatively low incidence. The second gives the number of cattle seized, per thousand, under the Tuberculosis Order from 1926-40 and shows the same distribution. The third gives the percentage of the total

cattle population in Attested Herds in each county, in 1945, and the fourth gives the equivalent data for 1947. From these two maps (the third and fourth) the great advances effected by the scheme since the end of the war can be seen, particularly the improvement in conditions in certain counties in the south-west of Scotland, and the great increase in the numbers of Attested cattle in England. The fifth map gives the "Tuberculosis Index" for each county. This figure is arrived at by subtracting the percentage of cattle in Attested Herds for 1947 from 100 and adding the result to the percentage of reactors in the 1938 survey and to the number of cattle seized per thousand under the Tuberculosis Order in 1926-40.

The data indicate that Wales, the south-western and northern counties of England, and the south-western counties of Scotland are in a good position, while in the counties which supply industrial areas conditions are still bad, although the latest figures for Cheshire, one of the worst areas, indicate an improvement in that part of England.—R. M. LOOSMORE.

CHRISTIANSEN. (1949.) **La lutte contre la tuberculose bovine sur la base des expériences faites au Danemark. [Control of bovine tuberculosis in Denmark.]**—*Bull. Off. Internat. Epiz.* 31. 566-576. 2758

At a meeting of the Confédération européenne pour l'Agriculture at Innsbruck in 1949, the author, a veterinary inspector in Denmark, outlined the steps taken in controlling bovine tuberculosis in his country, also giving details concerning the increase in the number of veterinary officers, of tuberculin tests, and details of the milk regulations. Animals with advanced TB. must be excluded from clean pastures and from sales and shows. Tuberculous cows must not be transported at the same time as healthy cows.—W. R. BETT.

I. GLOVER, R. E. (1949.) **Tuberculosis in animals other than cattle.**—*Vet. Rec.* 61. 875-878. Discussion pp. 881-883. 2759

II. DOBSON, N. (1949.) **Tuberculosis in animals other than cattle.**—*Ibid.* 878-880. Discussion pp. 881-883. 2760

III. PATERSON, A. B. (1949.) **Tuberculosis in animals other than cattle.**—*Ibid.* 880-881. Discussion pp. 881-883. 2761

I. G. reviewed the disease in the horse, dog, and cat under the following headings: incidence, sources of infection, development of enhanced resistance, alterations in virulence of the organism by animal passage, the tuberculin test, and the control of the disease in relation to Public Health.

The horse is the only known mammal which appears to be able to reduce the virulence of the tubercle bacillus with comparative ease. The high

proportion of bovine strains isolated from the horse which are of sub-standard virulence were probably bovine strains of full virulence acquired early in life: those which on isolation from horses are still of standard virulence are probably of more recent origin.

The need was stressed for further careful observations on the value of the tuberculin test in horses and dogs; assessment of the value of the test is possible only when exhaustive P.M. examinations are conducted, including biological tests in negative cases.

Horses are probably of no significance as a source of tuberculous infection in man. Dogs and cats are a more likely source of infection but there is very little real evidence on this point. There is evidence that dogs may acquire infection from tuberculous owners. TB. in household animals which come into intimate contact with man must be regarded as a possible source of danger.

II. After a brief review of the history of the development of knowledge of TB. in birds D. discussed the disease under the following headings: type of bacillus, pathogenicity for mammals, symptoms in fowls, lesions, method of infection, tuberculin testing, and prevention of introduction of disease into a flock.

Members of the parrot family may be infected with human, bovine, or avian types of the tubercle bacillus. All species of birds seem to be susceptible to the avian type of bacillus, and the infected bird is the most important agent in the spread of the disease. Poor husbandry probably plays a large part in spreading the disease: good ventilation of poultry houses and the avoidance of crowding are particularly important in reducing the incidence of the disease. The egg is unlikely to be a serious factor in the transmission of infection.

III. This is a description of the method of preparation of P.P.D. tuberculin used at the Veterinary Laboratory of the Ministry of Agriculture at Weybridge. Tentative directions for the use of this tuberculin in the intradermal test are given for the horse, pig, dog, and cat. Intradermal tests in the rabbit are stated to be unsatisfactory.—E. G. WHITE.

URBAIN, A. (1949.) Deux cas de tuberculose spontanée d'origine aviaire chez un singe africain: Cercopitèque grivet (*Cercopithecus oethiops* L.) et chez un singe américain: Ouistiti à pinceaux blancs (*Hapale jacchus* L.). [Avian type tuberculosis in monkeys.]—*Bull. Acad. vét. Fr.* 22. 349–351. 2762

Avian type *Mycobacterium tuberculosis* infection is described in two monkeys. One was ill and the disease was generalized. The other died suddenly and had lesions in the liver, spleen, and

lungs. In one of them the disease appears to have been associated with the consumption of raw eggs.

—G. V. LAUGIER.

ANON. (1949.) **Non-pulmonary tuberculosis in England and Wales. Account of a group investigation undertaken during the years 1943 to 1945. (Report to the Medical Research Council).**—*J. Hyg., Camb.* 47. 337–359. [Summary and conclusions copied *verbatim*.] 2763

Tubercle bacilli were isolated and typed from 112 patients in Wales. Of these strains, 19 or 17.0 % belonged to the bovine and 93 or 83 % to the human type. The proportion of bovine-type infections at all ages was as follows: meningitis 10.1 %, cervical adenitis 44.4 %, and bone and joint tuberculosis 19.0 %. The proportion of bovine infections was 22.4 % under 15 years of age and 11.1 % at 15 years and over. No appreciable difference was found in the proportion of bovine infections between males and females. A history of exposure to contact with an open case of pulmonary tuberculosis was obtained in 18.4 % of cases of human-type infection about which information was available, and in 6.7 % of cases of bovine-type infection. Of patients infected with the bovine type about whom information was available, 80 % gave a history of habitual raw milk consumption, as against 55.4 % of patients infected with the human type.

From thirty-three cases examined no tubercle bacilli were isolated. The commonest lesion from which negative findings were recorded was cervical adenitis, and the commonest age group 15 years and over.

Comparison with the English figures shows that the proportion of bovine-type infections in non-pulmonary tuberculosis is lower in Wales than in England. Two or three factors may be responsible for this difference, but undoubtedly one important factor is the much higher proportion of cattle in Attested herds in Wales than in England—21.3 % as against 5.4 %. Considered in conjunction with the fairly high proportion of milk pasteurized or heat-treated in the larger towns of South Wales, this may be taken to indicate that the milk supply to the public is probably less often infected with tubercle bacilli in Wales than in England.

Applying the proportions of bovine-type infections recorded to the deaths from different forms of non-pulmonary tuberculosis listed by the Registrar-General, it may be calculated that in Wales about fifty persons died in 1944 from tuberculosis of bovine origin. Taking the figures for the two countries together, it may be said that about 24 % of all cases of non-pulmonary tuber-

culosis were due to infection with the bovine type of tubercle bacillus, and that between 1,300 and 1,400 persons died in 1944 from tuberculosis of bovine origin. It is submitted that probably none of these deaths would have occurred if the milk supply had been adequately pasteurized.

GUALANDI, G. (1948.) Sulla tubercolinizzazione endovenosa nei bovini. [**Intravenous tuberculin test in cattle.**—*Nuova Vet.* 24. 119–123 & 150–154. 2764

From the results he obtained, G. concludes that the intravenous tuberculin test is convenient, requiring the taking of temperatures at the fifth and seventh hours only; that it does not produce reactions in the unaffected animal, and that the systemic disturbance accompanying a positive reaction is not serious. It is stated that the test can be repeated in a short time without variation in the result, and it does not affect the results of the intradermal or subcutaneous tests if these are done a short time after.—I. W. JENNINGS.

CORPER, H. J., & COHN, M. L. (1950.) **The stability of tuberculin.**—*Tubercle, Lond.* 31. 122–130. [Authors' summary copied *verbatim*.] 2765

Tuberculin (tuberculoprotein), the biologically active and specific constituent of the tubercle bacillus liberated by autolysis into the nutrient medium following growth at incubator temperature (37° C.), can still be found in the remaining nutrient medium liquid in stable form and without apparent loss of biological activity after more than eight years' residence at incubator temperature (37° C.), although there may be some biologically insignificant protein molecular degradation after this long period of time.

In appropriately buffered solutions at about pH 7.0, free from preservatives or contamination and in sealed amber glass ampoules to avoid evaporation, tuberculin dilutions are stable (biologically) for over nine years at room and refrigerator temperatures but not at incubator temperature. Dilutions in unbuffered saline solution are not stable.

Heating of tuberculin (tuberculoprotein) in the natural (Seitz) filtrate from a two-month-old culture of human tubercle bacilli at or below pH 6.0 results in a loss of tuberculin (tuberculoprotein) from the solution. This effect of heat is less appreciable in an eight-year-old culture maintained at 37° C. in that a lower pH is required to cause heat precipitation and tuberculin loss.

From this and previous studies on autolytic tuberculin, it appears reasonable to assume that the tubercle bacillus possesses autolytic enzymes capable of producing tuberculin *in vitro* but not capable of carrying the active material beyond the specific biologically active protein stage.

STENIUS, R. (1948.) Bidrag till frågan om hästens tuberkulinallergi. [**Tuberculin allergy in the horse.**—*Suom. Eläinlääkärit.* 54. 219–225. [In Swedish.] 2766

In an earlier reported (1945) series of intradermal tuberculin tests on horses S. found that 47.3 % gave positive reactions. In repeating the trials with different types and preparations of tuberculin (bovine, human, avian) and ordinary meat broth as control on 252 healthy horses, which were known to be unexposed to tuberculous infections, he found that, depending on the type of tuberculin used, 43–61 % of them gave positive reactions when an increase of 2 mm. in the skin measurements read 48 and 72 hours after injection was considered positive. Avian type tuberculin gave the highest percentage, but even when meat broth alone was used there were 20 % positive reactors. When an increase of only 1 mm. was taken as positive the reactor percentage was 90–94. Another test series on 47 horses gave similar, but in some respects somewhat divergent results.

The reason for these peculiar findings is considered to be some kind of group allergic reactions caused by acid-fast bacteria closely related to *Mycobacterium tuberculosis*. The tuberculin test applied to horses was therefore considered to be of limited value only.—GUSTAV NAERLAND.

BOYDEN, S. V. (1950.) **Haemagglutinins from *Mycobacterium tuberculosis*.** [**Correspondence.**—*Nature, Lond.* 165. 765. 2767

A petrol ether extract of tubercle bacilli produced haemagglutination of those fowl erythrocytes which were also sensitive to certain lipid preparations. This agglutination could be inhibited by rabbit sera; the sera of tuberculous animals being considerably more effective than that of normal ones.—E. EDEN.

FLORESTANO, H. J. (1949.) **Tuberculocidal activity and toxicity of some diphenylmethane derivatives.**—*J. Pharmacol.* 96. 238–249. 2768

Of 28 derivatives of diphenylmethane 13 were active against tubercle bacilli in concentrations of 0.063–4.0 mg. %. Activity appeared to be dependent upon halogen and hydroxy group substitution. Toxicity towards mice was also studied.

—R. MARSHALL.

ILAND, C. N., & BAINES, S. (1949.) **The effect of penicillin on the tubercle bacillus: tubercle penicillinase.**—*J. Path. Bact.* 61. 329–335. 2769

The authors found that the alleged enhancing effect of penicillin on the growth of the tubercle bacillus did not result from the presence of the penicillin in the culture fluid. The condition was

caused by the improved aeration these cultures obtained during the frequent opening of the bottles necessitated by the penicillin assay. The virulent strain of tubercle bacillus used produced a penicillin-destroying substance that possessed enzyme-like characteristics, being destroyed by heating to 60° C. for one hour or shaking, having an optimum pH 6.0 and being adsorbed on a Seitz filter. This active substance was unstable and attempts to produce a stable solution by the Harper (1943) technique were unsuccessful.

—J. H. HALE.

GARDINER, P. A., REES, R. J. W., & ROBSON, J. M. (1949.) **Intracorneal infection as a method for testing antituberculous substances.**—*Brit. J. Pharmacol.* 4. 209–215. 2770

The rabbit cornea possesses the following advantages as an injection site for preliminary *in vivo* testing of anti-tuberculous drugs. The lesion has remarkably constant developmental characteristics, the second eye may be used as control. The lesion can easily be photographed, and the cornea is suitable for histological and bacteriological examination.—NESTA DEAN.

WEISER, R. S., EVANS, E., & ST. VINCENT, L. (1950.) **Tuberculin reaction. IV. Failure of pyribenzamine to protect against systemic tuberculin shock.**—*Proc. Soc. exp. Biol., N.Y.* 73. 303–305. 2771

Pyribenzamine, which was found to be capable of protecting animals against anaphylactic shock, was not, over a range of dosages and times of injection relative to the induced onset of shock, able to protect g. pigs against systemic tuberculin shock. It was concluded that histamine or related substances do not play a part in tuberculin shock and that anaphylactic and tuberculin sensitivities are not of the same nature.—R. MARSHALL.

FRAPPIER, A., & GUY, R. (1950.) **A new and practical B.C.G. skin test (the B.C.G. scarification test) for the detection of the total tuberculous allergy.**—*Canad. J. publ. Hlth.* 41. 72–83. [Authors' summary copied *verbatim*.] 2772

The authors describe and propose a new and practical skin test, introducing B.C.G. by scarification, in order to detect the total tuberculous allergy; that is, allergy to tuberculin as well as allergy to bacillary proteins, or bodies, infratuberculin allergy as well as tuberculin allergy.

Of 626 individuals found negative to a strong dose of tuberculin (0.005 mg. P.P.D.), 22.9 per cent. were still positive to the B.C.G. scarification test, showing infratuberculin allergy, *i.e.* an accelerated reaction to B.C.G. and the Willis phenomenon (reduction of the pre-allergic period

and enhancement of the reactivity to tuberculin). Similar findings were reported by a few authors using intradermal or puncture tests.

It was found that the optimum live B.C.G. concentration for the test—that is, the concentration strong enough to show a reaction in the least sensitive individuals, including those infratuberculin allergic, but still unable to induce scar-forming reactions among strongly allergic subjects—is not less than 10 mg. per c.c. and not more than 25 mg. per c.c., preferably less. The B.C.G. scarification test could be used for the following definite purposes: detection of infratuberculin allergy, epidemiological surveys of the distribution of tuberculous infection, and as an economical and efficient substitute for tuberculin tests in view of an immediate B.C.G. vaccination.

[The tests were done on human beings—Ed. V.B.]

BIRKHAUG, K. (1950.) **Antigenic activity of dry glucose BCG vaccine.**—*Amer. J. publ. Hlth.* 40. 545–554. [Author's conclusions copied *verbatim*.] 2773

Dry BCG glucose vaccine sustains a considerable loss of living elements during the freeze-drying process, but its viability remains unchanged for more than one year when stored at 2° C. to 4° C. The morphologic, cultural, and biologic characteristics of dry BCG remain unaltered after the freeze-drying process. The antigenicity of dry BCG vaccine is quantitatively, but not qualitatively, lower than that of fresh liquid vaccine as demonstrated by skin lesions produced with graded doses of vaccine, tuberculin sensitivity, and resistance against a challenge infection with virulent tubercle bacilli. Dry BCG glucose vaccine is capable of producing typical skin lesions and tuberculin sensitivity in man, but of less intensity than that produced by fresh liquid vaccine.

Although quantitatively inferior to fresh liquid vaccine in living organisms, dry BCG vaccine has the distinct advantage over fresh liquid vaccine of retaining its antigenic activity over long periods while desirable tests are being completed for its purity, harmlessness, and antigenic potency before its use in man. With adequate adjustment of dosage with reference to living organisms, dry BCG vaccine should prove useful in localities having no access to fresh liquid vaccine.

POLLOCK, M. R., HOWARD, G. H., & BOUGHTON, B. W. (1949.) **Studies on a bacterium needing long-chain unsaturated fatty acids for growth.**—*Biochem. J.* 44. No. 5. p. lii of Proceedings. 2774

A diphtheroid bacterium, *Corynebacterium* Q requires 1:25,000 oleic acid for growth. The growth is proportional to the amount of oleate in

the range 0.5–10 μ g. per ml. Elaidic, petroselinic, linoleic, linolenic, or palmitoleic acid could replace oleic acid. $\alpha\beta$ -Oleic, erucic, and brassidic acids were all inactive and so were all the saturated acids tested (including lauric, myristic, palmitic, stearic, dibromostearic and dihydroxystearic). The organism needs one double bond. The function of lipoids in micro-organisms is briefly discussed.

—MALCOLM WOODBINE.

MORSE, E. V. (1950.) **Further studies on the cultural and biochemical characteristics of some diphtheroid bacilli isolated from animals.**—*Cornell Vet.* 40. 49–55. 2775

Corynebacteria isolated from animals were tested for their action on glucose, urea, and urea plus glucose by incorporating these substances in broth. *C. renale* strains were found to be most active in splitting urea. M. found that tellurite-containing media were of little value in isolation or differentiation of these diphtheroids since this substance is too inhibitory to their growth.

—J. H. HALE.

PUJATTI, O. (1948.) Su di un focolaio di morva equina concomitante ad infezione streptococcica. [A focus of *Pfeifferella mallei* infection accompanying strangles.]—*Nuova Vet.* 24. 158–162. 2776

An account of three cases of glanders that were revealed clinically following an outbreak of strangles.—I. W. JENNINGS.

EIELAND, E., & FINBORUD, J. (1950.) *Listerella monocytogenes*-infeksjon hos en sau i Sør-Trøndelag. [*Erysipelothrix* (*Listeria*) *monocytogenes* infection in a sheep in Norway.]—*Nord. Vet.-Med.* 2. 19–22. [English and German Summaries. Abst. from English summary.] 2777

On a hill-farm in Norway, a breeding ram died from a disease with brain symptoms, slight convulsions, conjunctivitis, and cloudiness of the cornea.

Autopsy revealed distinct congestion of the meningeal vessels, especially at the level of the medulla oblongata. Histological examination of the brain showed marked inflammatory infiltration with round-cells and polymorphonuclear cells, in some areas with a tendency to necrosis in the infiltrations.

Cultures from the brain showed growth of bacteria which on further examination were taken to be *E. monocytogenes*.

I. AMANZHULOV, S. A., & SHTEINGART. (1947.) [Caprine contagious pleuro-pneumonia].—*Veterinariya, Moscow.* 24. No. 8. pp. 23–25. 2778

II. IVANOV, M. I. (1947.) [A pleuro-pneumonia-

like virus disease in goats.]—*Veterinariya, Moscow.* 24. No. 9. pp. 23–25. 2779

I. The authors examined a large number of goats affected with the contagious pleuro-pneumonia of that species and in 77 % of cases isolated from the lungs an organism which they speak of as *Bacillus bipolaris caprisepticus*. In the remaining 23 % no bacteria were found and the authors suggest that there may be two forms of this disease, the pathogen of the second being some unknown non-filtrable virus. This conforms with conclusions arrived at by other Russian workers [see following abst.]. The epidemiology and the preparation and use of vaccines against the pasteur-ella organism are discussed.

II. Complement-fixation tests have led the author to the conclusion that the disease is caused by a variant of the bovine contagious pleuro-pneumonia organism, and he suggests that the organism may either migrate between cattle and goats or has now permanently adapted itself to goats.—F. A. A.

PULLAR, E. M. (1949.) **Infectious pneumonia of pigs. III. Transmission experiments and a field trial of a formalin-killed vaccine.**—*Aust. vet. J.* 25. 123–130. 2780

Of pigs exposed to infectious pneumonia by contact and by respiratory tract instillation, only a few developed clinical signs of pneumonia, and in these animals lesions were inconstant and usually small. It is suggested that the reasons for the small proportion affected may have been the absence of continuous exposure to the infection, and that the standard of husbandry was higher than in naturally affected herds.

A formalin-killed vaccine of *Pasteurella suisepitica* and *Salmonella suispestifer* was used in a herd over a period of two and a half years, and 166 vaccinated and 295 control pigs were examined P.M.

The only significant difference between the vaccinated and control groups was a greater proportion of red hepatization to grey hepatization in the vaccinated pigs. No significant differences were seen in the incidence or mortality rate of pneumonia in healed pulmonary lesions, extent of lesions, lobes involved, nor in the growth rates of the two groups.—J. H. WHITTEM.

WESTERMARCK, H. (1946.) *Influenta-bakteerin* (*Haemophilus influenzae suis*) esiintymisestä porsasyskän yhteydessä. [*Haemophilus influenzae-suis* infection in pigs.]—*Suom. Eläinlääkäril.* 52. 256–261. [Abst. from Swedish summary.] 2781

W. isolated *H. influenzae-suis* from Finnish pigs. When the necessary requirements are met the organism is fairly easy to grow, producing

both S and R colonies. W. states that it cannot be demonstrated in all cases of influenza in young pigs. The disease seems to be most successfully controlled by prophylactic and hygienic measures.

—GUSTAV NAERLAND.

DE LEÓN, J. P., EPSTEIN, B., TEDESCO, L. F., & PIÑÓN, J. C. (1949.) Contribución al estudio clínico y experimental con la *Salmonella abortus equi*. [**Clinical and experimental studies on *Salmonella abortus-equi* infection.**]—*Rev. Med. vet., Montevideo*. 4. 849-868. [Abst. from English summary.] 2782

An account of *Salmonella abortus-equi* infection in mares. Details are given of cultures isolated and of agglutination tests carried out. Some study was made of the pathology of the disease and of immunization.

SCHMIDT, K. (1949.) Infektion eines Pferdes mit *Bact. paratyphi B* (Schottmüller). [***Salmonella paratyphi B* infection in a horse.**]—*Mh. Vet.-Med.* 4. 219. 2783

From the liver of a horse, slaughtered because of a purulent infection of the facial sinuses, *S. paratyphi B* was isolated. The source of infection could not be traced.—A. MAYR-HARTING.

SCHOENING, H. W., DALE, C. N., MOTT, L. O., & HABERMANN, R. T. (1949.) **Pathogenicity of *Salmonella cholerae-suis*: maintaining virulence by lyophilization.**—*Amer. J. vet. Res.* 10. 101-110. [33 refs.] 2784

Because *S. cholerae-suis* infection in pigs appears to depend upon many variable factors, investigation of the significance of one factor necessitates the maintenance of others as nearly constant as possible.

The virulence of the culture used is an important variable and experiments are described which indicate that lyophilized culture maintains constant virulence at least up to ten years. Experiments included such variables as: age of host and state of immunity, age of culture, strain of organism, and methods of administration and/or exposure.

—F. T. W. JORDAN.

SIMMONS, G. C., & SUTHERLAND, A. K. (1950.) **Observations on the occurrence of salmonellae in domestic animals and birds in Queensland.**—*Aust. vet. J.* 26. 57-62. 2785

The *Salmonella* species isolated from animal and bird sources in Queensland over a period of nine years are recorded. The following conditions are discussed: avian salmonellosis (excluding *S. pullorum*)—18 outbreaks due to 11 salmonella types; porcine salmonellosis—32 outbreaks, 25 of them due to *S. cholerae-suis*; bovine salmonellosis—8 outbreaks, 5 due to *S. typhi-murium*.

—J. H. WHITEM.

BLOOMFIELD, A. L., RANTZ, L. A., LEW, W., & ZUCKERMAN, A. (1949.) **Relation of a specific strain of salmonella to ulcerative cecitis of rats.**—*Proc. Soc. exp. Biol., N.Y.* 71. 457-461. 2786

The authors discuss their earlier findings and describe experiments in which seven groups each comprising six young rats were given a stock laboratory diet and were killed at fortnightly intervals from 2-5 months of age. There was no evidence of salmonella infection in the groups killed at 2, 2.5, or 3 months of age, but from nine of the remaining 24 animals positive cultures of *S. enteritidis* (Kauffman-White Group D) were obtained. In all but one of these positive animals, gross lesions of ulcerative caecitis were present. In the exception the number of organisms recovered was small. Positive serum agglutination titres to the organism were, from these and other experiments, found to be present before the age when positive cultures were first obtained.

The drinking-water of rats two months old was contaminated with a 24-hour culture of *S. enteritidis* for five consecutive days. Three months later there was a far higher incidence of ulcerative caecitis in these animals than in control rats, although at two months the incidence was only slightly above that in the controls.

It is concluded that while some synergistic agent is not excluded, its existence seems unlikely.

—ALASTAIR N. WORDEN.

GOERZ-OBENDORFER, G., & SCHOENE, W. (1950.) **Gehäuftes Auftreten von Breslau-Infektionen in einem Kaninchenbestand, zugleich ein Beitrag zur Frage der Hitzebeständigkeit von Fleisch-vergifterbakterien.** [***Salmonella typhi-murium* infection in rabbits and heat-resistance of micro-organisms causing meat poisoning.**]—*Mh. Vet.-med.* 5. 55-56. 2787

Twelve rabbits out of a stock of 18 fell ill. Of these six died, two recovered, and four were killed. *S. typhi-murium* was isolated from the organs of one of the rabbits that had died. The meat of the four rabbits that were killed was boiled for two hours and bottled and kept. Some of the soup from this was mixed with a dish of goose giblets. All of three people who partook of this mixed dish became ill after 12-18 hours with symptoms of food poisoning. It is inferred that this illness was the result of infection and not of the action of toxins.

The preserved meat went bad with gas formation. The authors suggest that the cooking had been insufficient to sterilize this meat, and that it was the organisms in this meat which were responsible for the illness.

—A. MAYR-HARTING.

SNOEYENBOS, G. H., CROTTY, A. M., & VAN ROEKEL, H. (1950.) **Some antigenic characteristics of *Salmonella pullorum*.**—*Amer. J. vet. Res.* 11. 221–225. [Authors' summary copied *verbatim*.] 2788

None of the cultures studied in this survey proved to be of the variant form of *Salmonella pullorum*. In some *S. pullorum*-infected flocks, the ratio between the number of colonies containing XII₂++ antigen and those containing XII₃++ antigen, as indicated by primary culture isolations, varied widely between different infected birds in a flock as well as between different sites of isolation in individual birds. Cultures isolated from eggs of infected birds may show a variation in the balance of these antigens over a period of time. In some *S. pullorum*-infected flocks in which the isolated colonial growth was predominantly XII₃++, the antigenic composition of cultures isolated showed considerable uniformity. No cultures containing only XII₃++ colonies were found. In one flock studied, the serums from a significant number of birds produced positive agglutination of a standard strain antigen and little or no agglutination of a variant strain antigen. Three out of four of these birds, cultured later, proved to be infected. Similar agglutination reaction was produced by the serums of four infected birds from three other flocks. It appears that serums of birds infected with a non-variant form of *S. pullorum* may, at times, agglutinate variant antigens and not standard antigens. Cultures which showed a marked mixing of XII₂++ and XII₃++ colonial forms at primary isolation showed a tendency to become predominantly XII₃++ forms following even short periods of growth and transfers on the artificial mediums used. Sensitivity of XII₃++ forms to agglutination by homologous serum may be rapidly lost following growth on artificial mediums. Birds infected with *S. pullorum* not of a variant form may yield cultures with almost any ratio between XII₂ and XII₃ antigens; this being a variable factor, concise classification of these forms is impracticable.

MANTHEI, C. A., & CARTER, R. W. (1950.) **Persistence of *Brucella abortus* infection in cattle.** *Amer. J. vet. Res.* 11. 173–180. [Authors' summary slightly amended.] 2789

In cows artificially exposed to virulent *Brucella abortus*, the degree of blood stream infection was related to susceptibility and/or resistance of the animals and calving performance. (a) A high incidence and persistence of bacteriemia were associated with highly susceptible animals and a high abortion rate. (b) A low incidence and persistence of bacteriemia were associated with cows which became infected but showed varying degrees

of resistance. Furthermore, bacteriemia was not demonstrated in cows which had complete resistance against exposure. (c) A transient bacteriemia was encountered in 3 exposed cattle where no other evidence of infection was demonstrated. The condition is apparently rare.

No major differences could be demonstrated in the course of brucellosis between artificially and naturally infected cows.

In 18 artificially infected cattle, blood, genital, and udder infections were studied for two years. (a) The degree of *Brucella* infection in the blood and genital tract was highest near termination of the first gestation following exposure. (b) *Brucella abortus* was demonstrated in the blood stream of 1 cow for as long as ninety-seven weeks and in the genital tract of another cow for 101 weeks. (c) Genital infection was the most persistent in a repeat breeder cow. (d) *Brucella abortus* was not isolated from the genital tract of 12 cows between conception and second parturition. However, 3 of these animals had genital infection at the time of the second parturition or shortly thereafter. (e) *Brucella* organisms were recovered from both the blood and urogenital tract at irregular intervals. (f) The estrual cycle was very irregular in the cows classified as repeat breeders or nonbreeders. (g) Recoveries of *Brucella* from the vagina were not necessarily associated with estrus. (h) *Brucella abortus* localizes most frequently in the udder and supramammary lymph glands of cattle.

I. FRANK, J. F. (1950.) **The presence of *Brucella abortus* agglutinins in swine of the Maritime area [of Canada].**—*Canad. J. comp. Med.* 14. 83–85. [Author's summary slightly modified.] 2790

II. MOORE, T. (1950.) **The presence of *Brucella abortus* agglutinins in swine of the Central area [of Canada].**—*Ibid.* 86. [Author's summary copied *verbatim*.] 2791

III. DUTHIE, R. C. (1950.) **The presence of *Brucella abortus* agglutinins in swine of the Prairie area [of Canada].**—*Ibid.* 87. [Author's summary copied *verbatim*.] 2792

IV. MOYNIHAN, I. W. (1950.) **The presence of *Brucella abortus* agglutinins in swine of the Pacific and Prairie areas [of Canada].**—*Ibid.* 88–89. 2793

I. Sera from 3,044 swine, shipped to abattoirs from a large number of premises in the three maritime provinces of Canada were examined for the presence of *brucella* agglutinins. The highest titre obtained with standard *Brucella abortus* antigen was 1:80. It does not appear, therefore, that swine brucellosis is a problem in these provinces.

II. In this rather limited survey no sample was found which possessed agglutinins within a

range which would indicate infection and, if the samples are representative of those found in this part of the country, it would appear that brucellosis of swine is no problem.

III. 47 % of 3,250 samples covered by this report gave partial agglutination with *Br. abortus* antigen in dilutions from 1:10 to 1:80. Four samples only gave reactions comparable to a known positive serum. These four samples were from market pigs under one year. Samples from sows one year and over in which specific infection might have been anticipated were negative.

IV. Serum samples from 1,601 pigs that had been slaughtered in abattoirs in Vancouver, B.C., were tested for the presence of brucella agglutinins. Agglutination titres ranging from 1:10 to 1:80 were present in 637 samples; 964 samples yielded a negative result.—THOMAS MOORE.

DAVID, H. (1947.) Untersuchungen über die Tularämie in Österreich (1935–1945). [*Brucella tularensis* infection in Austria (1935–1945).]—*Wien. tierärztl. Mschr.* 34. 523–544. 2794

D. suggests that the tularaemia organism should be included in the brucella group or that it should be placed in a new genus between *Pfeifferella* and *Brucella* because of its serological affinities.

Outside the body of the host the organisms are rather resistant and remain alive for weeks on the blood-soiled fur of sick animals. In infected wounds they are not amenable to treatment by antiseptics. Although no complete analysis of the antigenic structure has been carried out, it could be established that Austrian strains which had lost their pathogenicity differed from the American strains serologically, and that the sera of soldiers infected in Russia contained antibodies which corresponded to the American strains.

Animals found naturally infected in Austria are hares, wild rabbits, and field mice; cats are very sensitive to the infection, and a spontaneous illness was observed in a hunting dog, although dogs are rather resistant to experimental infection. The author suspects that where a direct culture from the hare has been reported it has been a case of *Pasteurella pseudotuberculosis* infection, but not of tularaemia, as he was unable to isolate the organism directly from hares. From his experimental work D. concludes that transmission from animal to animal rarely occurs through the intact skin or by feeding. Wounds and arthropod bites are more likely routes of infection. All arthropods examined, including *Ixodes ricinus*, were found free from the infection. Methods of diagnosis are discussed. An agglutination titre of 1:20 is diagnostic if other *Brucella* infection can be excluded. Meinicke's flocculation reaction is also suitable, and

the intracutaneous test becomes positive very early in the illness.

From occurrence and spread of the disease the author concludes that it has been brought into Austria up the Danube and its tributaries, possibly by water rats.—A. MAYR-HARTING.

SMITH, H. W. (1949.) A search for bacteriophages active upon bacteria of the *Brucella* genus.—*J. Hyg., Camb.* 47. 414–415. [Author's summary slightly amended.] 2795

None of forty-eight strains of *Brucella abortus*, ten of *Br. melitensis*, and seven of *Br. suis* were shown to be lysogenic.

It was not possible to "adapt" bacteriophages that were active upon other species of bacteria to lyse brucella organisms.

Thirty samples of faeces, mainly from cows, four sewage samples, twelve specimens of uterine fluid from cows that had aborted, and twenty samples of bulk milk failed to yield bacteriophages active upon brucella organisms.

PATERSON, J. S., & PIRIE, N. W. (1948.) Attempted active immunisation of cattle against *Br. abortus* infection with an antigenic fraction.—*J. comp. Path.* 58. 227–231. 2796

An antigenic fraction prepared from dense suspensions of CO₂-sensitive *Brucella abortus* (McEwen 544), either by digestion with trypsin for 3–4 days at 40° C., or by autoclaving in neutral suspension for 15 min. at 120° C., and separated by ultracentrifugation, was tested for immunizing power in cattle.

The inoculation of 90 mg. in 2 ml. fluid, intradermally at four sites on the neck of ten heifers, produced a severe systemic disturbance, lasting for up to 14 days, and a marked agglutination response, up to 1:5,000 in 15 days. Six weeks after this inoculation the heifers were artificially inseminated; eight became pregnant and were used for further experiment.

One hundred and seventy-one days after the first inoculation a second inoculation of antigen (22.5 mg. in 0.5 ml. fluid) was given intradermally. Local and systemic reactions were much less pronounced, but there was inappetence. A secondary agglutination response occurred.

Six weeks after the second inoculation, when 3–5 months pregnant, the heifers were exposed to infection with a virulent *Br. abortus* suspension in the conjunctival sac, at the same time as a group of four brucella-negative uninoculated pregnant control heifers.

Three inoculated heifers aborted dead calves, and one produced a premature live calf. *Br. abortus* was isolated from the foetal membranes of all these animals. Four inoculated heifers produced

normal calves at full term, but *Br. abortus* was isolated from the foetal membranes of two. All four control heifers aborted dead calves, and *Br. abortus* was isolated from these.

The authors concluded that only two of the inoculated heifers resisted infection, and that this has little significance. The degree of protection afforded was much lower than that which resulted from a single inoculation of strain 19 vaccine.

—R. M. LOOSMORE.

PURRIEL, P., PRADINES BRAZIL, N., & CARLOTTA, D. (1948.) Acción de los antígenos brucelares en personas no contaminadas. [Effect of *Brucella* antigens in healthy subjects.]—*Arch. urug. Med.* 33. 178–183. [Abst. in *Bull. Hyg., Lond.* 25. 34–35 (1950), copied *verbatim*. Signed: J. C. BROOM.] 2797

Experiments were made to determine whether repeated injections of small quantities of the *Brucella* antigens used for skin tests would provoke immunity, and thus lead to mistakes in diagnosis. In the first experiment, five normal adults, all negative to skin, agglutination and opsonin tests, were given intradermal injections at intervals of ten days, of a suspension of *Brucella abortus* killed by heat. The course consisted of eleven doses of 10 million organisms, and two of 50 million—a total of 210 million bacilli over a period of about five months. No reaction was produced at the site of inoculation, but a small nodule which resolved slowly often appeared. This was considered to be not an allergic manifestation but merely the normal tissue reaction to the presence of foreign protein. At the end of the course, skin tests with brucellin were negative in all five subjects. No increase in the opsonic index could be demonstrated in the blood, and agglutinins were negative except in one case which had a positive titre of 1/25 only.

In another experiment, 50 million *Br. abortus* were injected on four occasions at the same intervals—200 million bacilli in one month. Skin and opsonin tests were negative. Agglutination titres of 1/50 and 1/25 were present in two cases; the third was negative.

In the third experiment, five persons were given 11 injections, each 0.1 ml. of brucellin, during a period of five months. All tests were negative in these cases at the end of the course.

It appears therefore that normal persons are not sensitized by the intradermal injection of these antigens.

MINETT, F. C. (1948.) Pathogenesis of black quarter. I. Tissue damage and spore latency.—*J. comp. Path.* 58. 201–209. 2798

Experimental inoculation of sheep with spores of *Clostridium chauvoei*, suspended in distilled water, and stored at $\pm 5^{\circ}\text{C}$., gave variable

results, presumably because of individual variations in susceptibility, and also, possibly, because of the longer germinating time of spores stored in the cold. It was found impossible to fix a minimal infective dose, but it appeared that infection could be produced more readily by the intramuscular than by the subcutaneous route. Intravenous inoculation produced no obvious effect. *In vitro* experiments gave no evidence that the presence of blood clot improved germination of spores, and *in vivo* experiments where spores were inoculated in blood clot, or into lacerated muscle, were equally inconclusive. Damage to the liver by carbon tetrachloride failed to produce any infection at this site from subsequent inoculations, both subcutaneous and intravenous.

Spore latency in the body after inoculation has been demonstrated up to 40 days in subcutaneous tissue, and up to 25 days in muscle tissue, the test being the production of lesions following inoculation of calcium chloride solution into the test sites. Cultural methods revealed spore latency up to 25 days in bone marrow, and up to 18 days in lymph nodes. No symptoms were observed in any of these sheep.—R. M. LOOSMORE.

I. MINETT, F. C. (1948.) Pathogenesis of black quarter. II. Influence of nutrition and of muscular exercise.—*J. comp. Path.* 58. 245–258. 2799

II. MINETT, F. C. (1948.) Pathogenesis of black quarter. III. Effect of chilling agencies.—*Ibid.* 259–266. 2800

I. M. investigated the effects of nutrition and muscular exercise on yearling sheep inoculated intramuscularly or subcutaneously with *Cl. chauvoei* spores.

He considers that, as tissue depressants make germination of latent spores easier, tissue damage may be the agency responsible for germination in nature and that “the natural damaging agent might be lactic acid, liberated in excess from the higher glycogen reserve of well-nourished muscles”.

In examining the effect of diet, the sheep, all under 18 months, were given mixtures of crushed oats, linseed cake, and wheat bran, with oat straw *ad lib*. For high carbohydrate diets molasses was included. The spore suspensions were prepared in distilled water and 1 ml. of a suitable dilution was injected into the muscle at the back of the thigh. The number of spores inoculated was estimated from the probability tables of HALVERSEN & ZIEGLER (1933).

The difference in muscle glycogen was significant in the high and low protein diet experiments, but there was no such difference in the carbohydrate experiments. Again in the high and low protein diet experiments there was no difference

in the mean values for muscle or blood lactic acid content.

In 12 experiments on the effect of muscular exercise, no good evidence that the susceptibility of sheep was modified could be adduced.

II. M. examined the resistance of apparently healthy young sheep to blackleg spores, when the sheep were subject to over-cooling. It was presumed that chilling would retard lymph flow and removal of spores from the injection site.

In experiments on local chilling, spores (10^5 — 13×10^6) were injected subcutaneously just above the fetlock of two limbs, or about the lumbar region or shoulder in the back and the sheep made to stand with the fetlocks in iced water or cold mud at 4° – 8° or 8° – 12° C. and ice packs were applied to the back.

In experiments on general chilling the spores (again in non-lethal doses, 100–500,000) were administered intravenously or subcutaneously, at 3–6 points in the back, or intramuscularly. Artificial showers applied for 30–60 min. and equivalent to 10 in. of rain per hour were also tried and the effect of natural rain was examined by inoculating the sheep and then tethering them out in the open during the monsoon season.

No evidence was obtained from any of the experiments to indicate that chilling agencies affect the pathogenesis of blackleg.

—MALCOLM WOODBINE.

DIMOCK, W. W., & WYANT, Z. N. (1949.) **Botulism in domestic animals. Cause—nature—diagnosis—and recommendations on prevention.**—*Circ. Ky agric. Exp. Sta.* No. 62. pp. 2–16. 2801

This is a general account of botulism as experienced in Kentucky. It is designed to provide the farmer with information on the disease.

—K. G. TOWERS.

I. LYUBASHENKO, S. Y., & NOVIKOVA, L. S. (1947.) [Equine leptospirosis.]—*Veterinariya, Moscow*. 24. No. 5. pp. 11–15. 2802

II. LYUBASHENKO, S. Y., & NOVIKOVA, L. S. (1947.) [Clinical signs, diagnosis, specific prophylaxis and therapy of equine leptospirosis.]—*Ibid.* No. 8. pp. 7–11. 2803

I. The authors concluded that infectious jaundice in horses is caused by leptospira. They described the morphological, serological, and cultural characteristics of two strains of leptospira isolated from two horses affected with jaundice, these organisms being identical with those obtained from the similar disease in cattle and from silver and arctic foxes. These two horses were from a batch of 12 that died out of a total of 40 infected on five different estates, where simultaneously cattle,

and in one place also silver foxes, were ill with infectious jaundice.

Three foals were intravenously infected with leptospira. One was killed and the organs fed to three foxes, which died, leptospira being demonstrated in the kidney culture of one fox and in a kidney section of another, none being found in the third. However, the last two foxes had developed interstitial nephritis and all three had had typical clinical symptoms of leptospirosis. The clinical pathology of the disease in these foals and foxes was similar to that of naturally affected animals.

II. Details of the acute, sub-acute, chronic, and atypical forms of leptospirosis are given. The authors recommend the stained slide agglutination test for diagnosis. Leptospira antiserum, obtained from horses hyperimmunized with leptospira from foxes, proved of value. It is stated that chemical prophylaxis with quinosal (potassium-oxyquinoline-sulphate), injected subcutaneously twice at a seven-day interval protected 386 horses on several farms where leptospirosis was present. [Duration of protection not stated.]—F. A. A.

LITTLE, R. B., & BAKER, J. A. (1950.) **Leptospirosis in cattle.**—*J. Amer. vet. med. Ass.* 116. 105–111. 2804

This is an account of leptospirosis in cattle in New Jersey, supplementary to the original account given by BAKER & LITTLE [see *V.B.* 19. 391]. The disease was first recognized in 1944. There is loss in milk yield during an acute attack and convalescence and reduction in the calf crop in affected herds: mortality is low.

The symptoms of the acute disease are fever (body temperature 103° – 107° F.), depression, anorexia, dyspnoea, drop in milk yield, icterus, and haemoglobinuria. The udder is soft and secretes blood-stained milk. Pregnant cows often abort. Severe cases are fatal within 2–10 days. The mild form is rarely fatal and lasts 2–4 days. The symptoms are similar but less marked. The body temperature is 102° – 105° F. for 2–3 days and the milk is usually thick, yellowish, and viscid: blood may be present in the strippings.

Diagnosis is established by inoculation of healthy cattle or laboratory animals with blood, milk, or urine, by isolation of the organism on culture media, by examination of sections or smears, or by serological examination of the blood of animals that have recovered. The spirochaete isolated in New Jersey was readily transmissible to g. pigs, chick embryos, rabbits, and mice; details of each method of diagnosis are given. Serological diagnosis is the simplest method and shows that during an outbreak many apparently normal animals contract the infection.

The natural mode of transmission is not

known. Cattle with a persistent renal infection may possibly perpetuate the disease from one summer to the next. Such carriers may also be a source of infection when introduced into healthy herds. Preventive measures suggested comprise the detection of infected animals by serological examination and retest not less than three weeks later. The urine of reactors should be examined for spirochaetes and infected animals should be isolated from the rest of the herd.

Comparison of the New Jersey strain with a strain from Palestine showed the two to be similar in cultural characters but differing in their infectivity for g. pigs and in antigenic properties. Strains recently isolated in Pennsylvania and Illinois have been shown to be similar to the New Jersey strain.—E. G. WHITE.

BRION, A., BERTRAND, M., & JULLIEN, G. (1949.) La néphrite leptospirique du chien en France. [*Canine leptospiral nephritis in France.*]—*Bull. Acad. vét. Fr.* 22. 71–75. 2805
The authors report three cases of leptospiral nephritis in dogs in France. In one of these the

diagnosis was confirmed by serological tests, and found to be *L. canicola* infection. The remaining two cases were diagnosed, one by the microscopic examination of tissue and animal inoculation, the other by microscopic examination of sections alone.
—I. W. JENNINGS.

MENGES, R. W., FURCOLOW, M. L., & RUHE, J. S. (1950.) *Experimental histoplasmosis in a dog. A nonfatal case.*—*Publ. Hlth. Rep., Wash.* 65. 628–631. [Authors' summary copied *verbatim.*] 2806

A case of nonfatal experimental histoplasmosis in a dog is described. The clinical symptoms, X-ray findings, and complete autopsy report are given. The case is presented to point out that nonfatal histoplasmosis may occur in dogs, and that only limited pathological lesions may be expected in recovered cases. In addition, *H. capsulatum* was not isolated by culture from any of the organs or tissues at autopsy, indicating that the fungus presumably was destroyed, and showing that the dog demonstrated a definite resistance to the infection.

See also absts. 2819 (staining of bacteria); 2869 (streptococcal mastitis); 2876 (swine erysipelas, pasteurellosis and salmonellosis); 2910–11 (avian salmonellosis); 2912 (bacteria in eggs); 2928 (tubercle bacillus); 2949 (report, Scotland); 2950 (report, dairy research); 2952–4 (reports, Australia); 2955–8 (reports, Canada); 2957 (report, S. Rhodesia); 2958 (report, Gold Coast Colony); 2959 (report, Nigeria); 2960 (report, N. Rhodesia); 2961 (report, Bermuda); 2962–4 (reports, U.S.A.).

DISEASES CAUSED BY PROTOZOAN PARASITES

FIENNES, R. N. T. W. (1948.) *Control of cattle trypanosomiasis.* [*Correspondence.*]—*Nature, Lond.* 161. 602–603. 2807

Resettlement in many parts of Africa will be possible only if stock is able to survive in the presence of trypanosomiasis. There is evidence that (1) some young wild animals are susceptible to trypanosomiasis whereas the adults are not susceptible. (2) Cattle in some areas are able to survive exposure to trypanosomiasis. (3) Under laboratory conditions young cattle may become resistant to particular strains of *T. congolense*. (4) Under field conditions control of the disease by persistent drug therapy seems to be associated with the development of a degree of resistance in cattle. There is therefore the possibility of disease control through the development of cattle which are resistant to infection.—S. BRIAN KENDALL.

BANKOWSKI, R. A. (1950.) *Effect of sulfaguandine upon the developmental stages of Eimeria tenella.*—*Amer. J. vet. Res.* 11. 130–136. 2808

B. attempted to determine, histologically, the extent of caecum infection in treated and untreated chickens and to ascertain which stage of the life-cycle was affected by sulphaguanidine. The chicks

were inoculated with sporulated oöcysts and immediately fed a mash containing 0.5 or 2 % drug continuously, or left as untreated controls. After 48 hours two chicks from each of the three groups were killed daily for histopathological examination of the caeca and drug determination of the contents. The drug had no demonstrable effect on the sporozoites but there was evidence, at both concentrations, of coccidiostasis upon the first generation schizonts. The 2 % mash was coccidiocidal to the second generation schizonts and, although there was no apparent schizont degeneration with 0.5 % drug, the asexual cycle was assumed to be indirectly affected by action on the merozoites in the caecal lumen. The coccidiostatic and coccidiocidal effects of sulphaguanidine on the schizogonous stages of *E. tenella* was influenced in effectiveness by the amount of drug administered.

—MALCOLM WOODBINE.

WIKTOR, T. J. (1950.) *Toxoplasmore animale. Sur une épidémie des lapins et des pigeons à Stanleyville (Congo Belge).* [*An epidemic of toxoplasmosis in rabbits and pigeons.*]—*Ann. Soc. belge Méd. trop.* 30. 97–107. 2809

An epidemic of toxoplasmosis killed about 80 % of 280 rabbits and 100 pigeons. Lesions were

seen particularly in spleen and liver as nodules resembling those of *Pasteurella rodentium* infection. Four strains of *Toxoplasma* were isolated, two from

rabbits and two from pigeons, and four successful passages were made through rabbits, g. pigs, and mice—JAS. G. O'SULLIVAN.

See also absts. 2877 (laboratory trypanosomiasis); 2878 (*T. congolense* infection); 2951 (report, N. Ireland); 2952-4 (reports, Australia); 2955-6 (reports, Canada); 2957 (report, S. Rhodesia); 2959 (report, Nigeria); 2960 (report, N. Rhodesia); 2962 (report, U.S.A.).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

TIERKEL, E. S., KOPROWSKI, H., BLACK, J., & GORRIE, R. H. (1949.) Preliminary observations in the comparative prophylactic vaccination of dogs against rabies with living virus vaccines and phenolized vaccine.—*Amer. J. vet. Res.* 10. 361-367. 2810

Thirty-two dogs were inoculated with one of several different vaccines; there were 15 unvaccinated controls. Sixty days later, immunity was challenged by injection into the masseter muscles of street virus—eight of the controls and two of the vaccinated animals died of rabies. There were no rabies deaths in those animals vaccinated with the egg-adapted Flury virus or with the rabbit-brain-fixed virus.

Homologous antibodies were detected in most of the vaccinated animals, but the serum of five of the seven controls which resisted street virus appeared to contain few if any specific antibodies demonstrable by the technique used.

As the authors observe: the number of animals in each group is not statistically significant; the unvaccinated dogs showed considerable resistance to rabies infection. In view of this the work must be regarded as preliminary in nature..

—L. M. MARKSON.

HOYLE, L. (1949.) Growth-cycle of influenza virus. [Correspondence].—*Nature, Lond.* 164. 1137-1138. 2811

Extracts of tissue infected with influenza virus contain two particles, the red-cell agglutinating elementary body and the soluble non-agglutinating antigen. In complement-fixation tests the former is partially strain-specific, the latter is non-specific. The soluble antigen is intracellular. When the virus elementary bodies enter a cell, they are converted into an intracellular phase (probably identical with the soluble antigen), in which multiplication occurs. With sufficient concentration the soluble antigen particles aggregate to form elementary bodies which are excreted. F. Fulton's suggestions [*Nature* (1949), 164. 189] are reviewed and criticized.—W. R. BETT.

I. SVEDMYR, A. (1949.) Studies on a factor in normal allantoic fluid inhibiting influenza virus haemagglutination. Precipitation-dissolution reaction in mixtures of active virus and inhibitor.—*Brit. J. exp. Path.* 30. 237-247. 2812

II. SVEDMYR, A. (1949.) Studies on a factor in normal allantoic fluid inhibiting influenza virus haemagglutination. Precipitation reaction in mixtures of inactive virus and inhibitor.—*Ibid.* 248-254. 2813

III. SVEDMYR, A. (1949.) Studies on a factor in normal allantoic fluid inhibiting influenza virus haemagglutination. The effect of active virus, proteolytic enzymes and periodate on the inhibitor.—*Ibid.* 254-266. 2814

I. Active PR8 influenza virus gives an immediate macroscopic precipitate when mixed with the haemagglutination inhibitor of allantoic fluid. The precipitate being gradually dissolved, free virus haemagglutinins reappear. Precipitation-dissolution can be repeated with a single virus aliquot by successive additions of fresh inhibitor.

II. Precipitates in mixtures of active PR8 influenza virus and haemagglutination inhibitor of allantoic fluid, obtained with properly pre-heated virus do not dissolve spontaneously on incubation. Virus antibodies prevent precipitation when added to the virus before adding the inhibitor.

III. Active virus, even in small amounts, slowly destroys haemagglutination inhibition and precipitation with high concentrations of active or inactive virus. Sodium periodate in low concentrations produces the same effect. Proteolytic enzymes, even in high concentrations, fail to abolish precipitation.—W. R. BETT.

SHCHERBATUKH, P. Y., & LEVASHOV, A. A. (1947.) [Immunization tests with light-inactivated vaccine in equine encephalomyelitis].—*Veterinariya, Moscow.* 24. No. 9. pp. 15-17. 2815

Equal parts of brain tissue and methylene blue diluted 1:25,000 and with 0.25 % phenol added, were exposed to sunlight for 15 min. Of 6,653 horses vaccinated, 1.53 % contracted equine encephalomyelitis, while of 6,488 controls 3.45 % became ill. The authors suggest that this vaccine, originally used by ISHUKOV [see *V.B.* 16. 45], would be of more value without the phenol.

—F. A. A.

BÜCK, G. (1950.) La paralysie contagieuse des porcs à Madagascar. [Teschén disease of pigs in Madagascar].—*Bull. Soc. Path. exot.* 43. 303-309. 2816

A disease of pigs characterized by paralysis and the incidence of which varied very markedly from year to year has been known in Madagascar for a long time. Field observations suggested that the condition was infectious. Pigs of all breeds, including the local Madagascar breed, were susceptible. No other species of animal was affected, but it is noted that a high incidence of the pig disease in 1946-47 coincided with a very serious epidemic of infantile paralysis.

The symptoms and the histology of the lesions in the central nervous system were similar to those of Teschen disease.

First attempts at experimental transmission of the disease by contact and by inoculation of brain material by various routes gave negative results but later experiments succeeded and these experiments were repeated and confirmed at the Pasteur Institute by Lépine, P., infection being transmitted by the intracerebral and intranasal injection of brain material.

B. considers that it is difficult to infect pigs in a good state of nutrition and suggests that this explains the failure of his earlier experiments.

—M. C.

WHITTEM, J. H., & BLOOD, D. C. (1950.) **Canine encephalitis. Pathological and clinical observations.**—*Aust. vet. j.* 26. 73-83. 2817

This paper presents the clinical and pathological findings in 52 natural cases of canine encephalitis. The survey was made to determine the types of clinical and pathological states occurring and to obtain some indication of the aetiological agents involved.—N. WICKHAM.

BOLIN, F. M., SCHLAMB, K. F., BRYANT, R. L., & EVELETH, D. F. (1949.) **A virus infection of**

turkeys and chickens.—*Amer. j. vet. Res.* 10. 391-395. 2818

The work of Eveleth *et al.* on "navel infection" of poults and baby chicks—the cause of which is thought to be a filtrable virus is mentioned.

The present study had two main objects: to examine (a) the source and dissemination of the virus and (b) the course of the disease during the three weeks after hatching. Fertile eggs from known turkey hens were used. Extreme sanitary precautions were used throughout and poults from each of four breeding pens and from each of four hatches per breeding pen kept separate. Results are given in detail and it appears that mortality may be greater than 50 %, that infection may be transmitted *via* the egg affecting both hatchability and viability of poults and also infection may be by post-hatching contact causing death in poults within the first three weeks of life. Other associated factors are mentioned.—F. T. W. JORDAN.

LURIA, S. E., & HUMAN, M. L. (1950.) **Chromatin staining of bacteria during bacteriophage infection.**—*j. Bact.* 59. 551-560. [Authors' summary copied *verbatim*.] 2819

Cytological observation of *Escherichia coli* stained for chromatin during bacteriophage infection reveals changes specific for different phages. Disruption of the chromatinic bodies of normal bacteria by phages of the T-even group is followed by swelling of the cells and filling up with granular chromatin (phage nucleoprotein?) if the phage is active, by fading away of the chromatin if the phage is inactivated by ultraviolet light. Other phages, when inactivated, still cause an accumulation of chromatin. No active phage could be obtained by disrupting bacteria infected with inactive phage.

See also *absts.* 2751 and 2795 (bacteriophage); 2778-9 (virus disease in goats); 2842 (neurotropic viruses); 2949 (report, Scotland); 2951 (report, N. Ireland); 2952-4 (reports, Australia); 2955-6 (reports, Canada); 2957 (report, S. Rhodesia); 2958 (report, Gold Coast Colony); 2959 (report, Nigeria); 2960 (report, N. Rhodesia); 2961 (report, Bermuda); 2962-4 (reports, U.S.A.).

IMMUNITY

RAMON, G. (1950.) **Les méthodes fondamentales d'immunisation active et leurs applications. [Methods of active immunization and their uses.]**—*Bull. Off. int. Epiz.* 33. 112-151. 2820

To induce active immunity it is necessary to inoculate the individual with an organism of which the virulence has become lessened though its antigenic power remains unaltered. Such a modification of the organism may occur naturally (as the passage of the variola virus through the cow) or it may be brought about artificially (as the effect of heat on *B. anthracis*).

Artificially attenuated vaccines usually maintain their avirulent state, but the risk of a return to the original virulence must always be considered.

Similar variations may be observed with naturally attenuated vaccines.

Attenuated living vaccines have been of benefit in conferring immunity against such diseases as exanthematic typhus, yellow fever, tuberculosis, plague, brucellosis, pleuro-pneumonia, etc.; undesirable results may nevertheless sometimes follow their use. These problems, together with the difficulty of standardizing living vaccines and the limits of time during which they remain stable, contribute to the uncertainty of the results of artificial immunization by this means.

A more dependable method is immunization with organisms killed by heat or other means so that their antigenicity is unimpaired. Some unpre-

dictable variations in virulence may also occur by this method, caused in some cases by the diffusion of the endotoxin from the killed organisms into the suspending medium.

A further method is available for those organisms which secrete an exotoxin. The toxin may be rendered non-toxic, while retaining its antigenic properties, by relatively simple methods such as the application of heat or formalin. Such modified toxins are called "anatoxines" [the term used in England is "toxoids"] and have the advantage of being stable, easily preserved, completely non-toxic and never reverting to a toxic state.

An additional advantage of toxoid as an immunizing agent is the ease with which it can be standardized by a flocculation test. The antigenic efficiency runs parallel with the strength of the diphtheria toxoid as determined by its flocculation with a diphtheritic antiserum. The toxoid may also be used in the production of antisera in horses for therapeutic use, and in their standardization. The ease with which the antigenic efficiency may be measured renders the toxoid a suitable antigen for the investigation of the properties of non-specific immunization adjuvants such as alum.

The use of toxin-antitoxin mixtures for immunization is not satisfactory because the degree of dissociation of toxin from antitoxin which occurs *in vivo* is difficult to estimate. Thus the amount of toxin which will become liberated in these circumstances is not easy to assess.

The principles of active immunization have been of considerable value in diphtheria, tetanus, gas gangrene, staphylococcal infections, anthrax, etc., but certain conditions must be satisfied. In the preparation of vaccines the amount of heat or formalin required must be determined for each antigen; the material injected should be sterile and the use of adjuvants, or substances on which the vaccine may be adsorbed, may be advantageous. Finally, a "booster" or "recall" dose should also be administered.—G. FULTON ROBERTS.

I. BABADZHANOV, S. N. (1947.) [Immunization against *ascaris* larvae.]—*Med. Parazitol., Moscow*. 16. No. 4. pp. 34–38. 2821

II. BABADZHANOV, S. N. (1947.) [Passive immunization against *ascaris* larvae with anti-polysaccharide serum.]—*Ibid.* pp. 38–41. 2822

I. A polysaccharide suspension of *Ascaris lumbricoides* larvae was injected into the abdominal region of each of 34 g. pigs in seven different dosages, three increasing doses of the preparation being given at weekly intervals. [The larvae were stated to have been bred in the laboratory; the host from which they were obtained is not

stated.] The higher doses used killed some of the animals. Ten days after the last injection larvae of *A. lumbricoides* were given *per os* to the surviving 24 g. pigs and to 24 controls in quantities ranging between 440–5,500 each. Two days later all were killed and P.M. examination revealed only occasional *ascaris* larvae in the alimentary canal of the immunized animals and that the other organs were free. In the controls larvae were found in the liver and lungs but none in the alimentary canal. Ten g. pigs were subjected to a similar test but with the *ascaris* larvae suspension derived from a bovine strain; no immunity was acquired.

II. Rabbits were injected intramuscularly with a polysaccharide suspension of *A. lumbricoides* larvae. Ten days later 3 ml. blood serum taken from them was injected intra-abdominally into each of ten g. pigs; another ten were injected, also abdominally, with normal (control) rabbit blood serum. Later on [period not stated] all the g. pigs and ten controls were given 4,000 laboratory bred *A. lumbricoides* larvae each *per os*. All 30 were killed two days later and P.M. examination revealed that there were no larvae in seven of the ten immunized ones (live weights 180–251 g.). In the other three in this group (live weights 220–253 g.), as in the other 20 g. pigs, larvae were present in the lungs and liver.

A vaccine prepared from a bovine strain of *ascaris* larvae and tested similarly, proved ineffective.—F. A. A.

FREIXA, P., MILLOT, P., & SAINT-MARTIN, A. (1950.) Traitement par exsanguino-transfusion ou transfusion simple du muletou nouveau-né, atteint d'ictère hémolytique par immunisation maternelle. [Treatment of icterus neonatorum in mule foals.]—*Rec. Méd. vét.* 126. 203–225. 2823

Unselected horse blood was used for transfusion, of which 1–2 l. was administered either through a plastic catheter by alternate withdrawing and replacing in the same vein, or by transfusing under pressure into the internal saphenous vein and letting blood simultaneously from the jugular vein. Simple transfusion of 500–800 ml. was performed alone in some cases. The effects of excess citrate are controlled by the administration of gluconate.

The cases were divided on clinical grounds into benign, serious without haemoglobinuria, and serious with haemoglobinuria. Those in the last class all died without treatment, haemoglobinuria being regarded as a fatal sign. The mild cases all recovered with simple transfusion and those classed as serious without haemoglobinuria all recovered with exchange-transfusion. It was thought likely that some in each of the latter classes would have

died without treatment. Details of each of the 18 cases studied are given.—G. FULTON ROBERTS.

SHAPIRO, M. (1949.) **Rh sensitization and replacement transfusion.**—*S. Afr. med. J.* 23. 576–583. 2824

The Rh factor of the human subject is a complex of six main antigens, the most important being the Rh or D antigen since it is the one most capable of exciting antibodies. So far as is known the Rh antigens are confined to the red blood cells and when these gain access to a person whose blood lacks one or more of the antigens, specific antibodies are produced. A first dose of antigen sensitizes but rarely produces immunization; subsequent doses of antigen, however, produce high titres. Sensitization is usually due to a defect of the placenta which permits foetal red cells to enter the maternal circulation so that if the mother is Rh-negative, the production of antibodies is stimulated. These may filter back through the placenta and thus cause the destruction of the foetal red blood corpuscles. The transfusion of Rh incompatible blood is another cause of sensitization, as little as 0.13 ml. of blood being sufficient to cause it.

Prenatal diagnosis is possible by the typing of blood from both parents, but a definite diagnosis of foetal sensitization cannot be made until the cord blood has been typed. If sensitization has occurred, transfusion therapy with Rh-negative blood can be carried out with complete confidence. —J. A. NICHOLSON.

CHARY, R. (1950.) Contribution à l'étude des groupes d'iso-agglutination chez le cheval. [**Iso-agglutinins in the horse.**]—*Rec. Méd. vét.* 126. 226–238. 2825

After reviewing the previously published reports on this subject, the author gives the detailed results of the 4,356 combinations of serum and cells from 66 horses; agglutination was observed in 839 combinations. The sera were used diluted 1:2, mixed with a 1 % suspension of cells.

It was concluded that 57 % of horses contained A and B antigens [not, of course, related to the human A and B blood group substances] in their cells but no agglutinin in the serum, while 3 % contained no antigen in the cells and the serum contained either anti-A alone, or anti-B in addition. 9 % contained A either alone or with secondary factors (of which there are many) in the cells with, in the serum, anti-B and agglutinins against the secondary antigens not present in the cells. A further 9 % belonged to group B in a similar way. 23 % belonged to group AB but contained in addition agglutinins against some secondary factors. Only three horses had identical blood

groups. The agglutinin titre was low in those cases studied.—G. FULTON ROBERTS.

FORMAN, C., MERTENS, E., GRAUB, M., & EHRLICH, W. (1949.) **Blood histamine, leukocytes and platelets in experimental serum disease in rabbits.**—*Proc. Soc. exp. Biol., N.Y.* 72. 439–443. 2826

Twenty-five rabbits were given 15 ml. per kg. of normal horse serum containing preservative and 15 similar quantities without preservative. The animals were desensitized with 1 ml. of serum intravenously 17 days later and two days later were given a further injection of 15 ml. per kg. Twenty-four of these rabbits were given serum only in the second injection, while 16 were given 20 mg. of an anti-histamine preparation subcutaneously four times daily for three days further. The following investigations were made: urinalysis, histamine level, leucocyte and platelet counts, and morbid histological study at varying intervals.

The Arthus reaction was not altered by the anti-histamine preparation in the 20 rabbits tested. The proteinuria which occurred following the first injection was abolished by the anti-histamine preparation. The histamine level rose after the first horse serum injection, but fell after the second. This rise in blood histamine was not observed in rabbits receiving the anti-histamine preparation.

After the first injection there was a rise successively of the eosinophiles, the neutrophiles and finally the lymphoid cells, the basophiles remaining unchanged. The re-injection of serum, while not affecting the eosinophiles or neutrophiles, caused a temporary fall followed by a marked rise of the lymphocytes and basophiles. The platelets rose after the first injection but not after the second.

The histological changes were complicated by differences between the group of animals receiving serum with preservative and that receiving serum without preservative. In general, the second injection noticeably increased the intensity of the glomerulitis, valvulitis, and arteritis, the two latter occurring only after the second injection. The mesenchymal reactions in the lungs and myocardium were less intensified and were the more readily dispersed by the anti-histamine preparation. The use of the latter exerted no significant effect on the changes found after the second injection.

The implications considered were that the first injection of serum is followed by a rise in the histamine and platelets, a temporary proteinuria and mesenchymal reactions in the lungs and heart. These changes were suppressed by the anti-histamine preparation, though the latter effect was thought to be due to a non-specific action of the drug on the permeability of the tissue membranes. Only those changes following the second injection

could be regarded as allergic. These consist of a rise in lymphocytes and basophiles and the arteritis and glomerulitis; these were unaffected by the anti-histamine preparation. Attention is drawn to the relationship between the release of histamine from the platelets, blood coagulation, and the release of heparin from the basophiles: and the relation of these to serum disease.

—G. FULTON ROBERTS.

SLAVIN, D. (1950.) **Production of antisera in rabbits using calcium alginate as an antigen depot.** [Correspondence.]—*Nature, Lond.* 165. 115–116. 2827

Rabbits were inoculated intraperitoneally with a 1.0 ml. concentrate of a dead broth culture of species of various organisms emulsified in 4.0 ml. of 5 % sodium alginate, followed by 2.5 ml. of

See also absts. 2766 (tuberculin allergy); 2773 (antigenic activity of BCG); 2780 (infectious pneumonia in pigs, vaccine); 2790–3 (*Brucella abortus*, agglutinins); 2796 (*Brucella abortus*, immunization); 2797 (*Brucella* antigens); 2810 (rabies vaccine); 2812–14 (influenza virus agglutination); 2815 (light-inactivated equine encephalomyelitis vaccine); 2829 (allergic reaction in scabies); 2972 (book).

—H. G. CLARK.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

BROWN, J. H., & KOHLS, G. M. (1950.) **The ticks of Alberta with special reference to distribution.**—*Canad. J. Res. Sect. D.* 28. 197–205. [Authors' abst. copied *verbatim*.] 2828

The material in this paper is the result of 11 years of collecting over the accessible portions of Alberta, with the exception of the settled area from Lac La Biche to Fort McMurray. The area north from Grimshaw to Fort Vermilion has not been surveyed in detail, and further collections will be made. Nine species are recorded: *Dermacentor andersoni* Stiles, *D. albipictus* (Packard), *Haemaphysalis chordeilis* (Packard), *H. leporipalustris* (Packard), *Ixodes angustus* Neumann, *I. kingi* Bishopp, *I. sculptus* Neumann, *I. spinipalpis* Hadwen and Nuttall, and *Otobius lagophilus* Cooley and Kohls. Maps showing the known distribution of the several species in Alberta are presented.

PRAKKEN, J. R., & VAN VLOTEN, T. J. (1949.) Allergie bij scabies. Positieve intracutane reacties met antigeen van scabies norvegica; gelukte passieve overdracht volgens Prausnitz-Küstner. [Allergy in scabies. Positive intracutaneous reactions with antigen from a case of scabies norvegica; successful passive conversion by the method of Prausnitz-Küstner.]—*Ned. Tijdschr. Geneesk.* 93. 2592–2600. [Abst. in *Bull. Hyg., Lond.* 25. 52. (1950), copied *verbatim*. Signed: A. L. Winner.] 2829

A review of the literature is given from which it is concluded that some of the skin lesions of scabies are allergic and not due to the immediate presence of the mite.

1 % calcium chloride into the same site. The sodium alginate is a viscous fluid from which a calcium gel is formed. After 2–3 weeks the rabbits were given three intravenous injections at 4-day intervals. The method depends on conditioning the reticulo-endothelial system to the reception of small doses of antigen by release from the alginate as it is absorbed, and then on flooding the system with large doses. By this method sera were obtained with agglutinin and precipitin titres as good as, or better than, those obtained by the usual methods, against a wide variety of bacteria, including *Streptococcus agalactiae* (8 strains). S. considers that this method should replace the usual one of intermittent inoculation of graded doses, since it is less work, safer for the rabbit, and produces as good or better antiserum.

A case is described of scabies norvegica or crustosa, i.e., scabies associated with a widespread crusted skin condition, the desquamated crusts containing very large numbers of scabies mites. The patient, aged 65, also suffered from syringomyelia and pain sense was absent. He felt no irritation whatever and probably therefore lacked the protective scratch reflex. From the quantity of mite-containing crusts and scales available, an alcoholic extract was prepared in various dilutions, which produced reactions in normal people only with the most concentrated specimens.

The patient himself reacted strongly to intradermal injection of the most dilute extracts as also did 12 out of 24 patients suffering from scabies and four out of 16 cured patients. Control solutions of saline and scales from a patient with erythrodermia gave negative reactions in the above, though some of the remaining patients reacted to both. Eighteen patients who had never suffered from scabies all gave negative reactions.

An attempt was made to demonstrate the antigen-antibody reaction by the passive conversion method of Prausnitz-Küstner. On the back of a known negative reactor two intracutaneous injections were given of the serum of the patient with scabies norvegica and two of serum from healthy persons. After 48 hours an intracutaneous injection of the scabies extract and a control solution respectively were made into one each of the above areas. A positive reaction occurred in the area injected with the scabies patient's serum and the scabies extract in eight out of 12 cases. In these the other three areas were negative. The reaction was negative when serum from an ordinary scabies

patient was used in four other patients as also in three cases when the erythrodermia extract was used.

The authors conclude therefore that the patient with scabies norvegica had been rendered

See also absts. 2949 (report, Scotland); 2952-4 (reports, Australia); 2955-6 (reports, Canada); 2957 (report, S. Rhodesia).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

BEARUP, A. J., & BOLLIGER, A. (1949.) **Trichostrongylus infections in the common phalanger** (*Trichosurus vulpecula*).—*Aust. J. Sci.* 12. 75-76. 2830

Diarrhoea and death in phalangiers (*Trichosurus vulpecula*) were caused by naturally acquired infestations with *Trichostrongylus colubrififormis* and *T. rugatus* which are common parasites of sheep. Counts of over 5,000 worms were recorded.

—H. MCL. GORDON.

BAKER, D. W. (1949.) **Gastrointestinal parasitisms of calves in New York State**.—*Rep. N.Y.St. Vet. Coll.* No. 27. pp. 237-250. 2831

The incidence of parasitism in calves occurring over the past four years, and the curative and prophylactic measures adopted are described. The manure from the cow byre was incriminated as the principal source of pasture contamination and B. advises that calves should be grazed on pasture which has not been top dressed with bovine manure nor grazed by adult cattle within the previous two years.

Strongyloides spp. were considered responsible for two outbreaks of uncontrollable dysentery in calves under three months old.

—GEORGE M. URQUHART.

GIBSON, T. E. (1950.) **Critical tests of phenothiazine as an anthelmintic for horses**.—*Vet. Rec.* 62. 341-342. [Author's summary copied *verbatim*.] 2832

Critical tests of phenothiazine carried out on five horses, each of which was given 30 grammes of phenothiazine by stomach tube, are reported. At this dosage the drug was highly efficient against mature small strongyles but had little effect on the large strongyles. In one horse, which was carrying large numbers of immature small strongyles, it was observed that these worms were not eliminated by the phenothiazine treatment. There seems little doubt that the high efficiency against the large strongyles reported by previous workers must have been referable to the higher dosage employed by them.

TODD, A. C., HULL, F. E., KELLEY, G. W., WYANT, Z. N., & HANSEN, M. F. (1949.) **Worm parasites in thoroughbred mares. A survey of occurrence, development, and control.**

hypersensitive to certain products of the mite and that a true-antigen-antibody reaction had been demonstrated. This is thought to confirm the theory that certain of the skin manifestations of scabies are allergic.

—*Bull. Ky agric. Exp. Sta.* No. 536. pp. 16. [Authors' summary copied *verbatim*.] 2833

A survey of the incidence and annual development of worm infections in mares and their foals was begun at 6 representative Thoroughbred nurseries in central Kentucky during the foaling season of 1948. The survey also sought the ultimate sources of infections for the foals and methods of preventing development of infections in the foals. The principal findings were as follows: (1) Incidence of infection in the mares and their apparent total worm burdens were conditioned by methods of worm control employed at the individual nurseries. Of the 45 mares in the survey, 40 (88.8 per cent.) were passing worm eggs on the day they foaled. (2) Total worm burdens of mares were found to increase in a cyclic manner after foaling, unless prevented by therapeutic treatment. The progressive increases appeared to be linked to re-infection and the development of warmer weather of spring and early summer. (3) The worm burdens of mares were composed almost exclusively of strongyle infections and comprised the ultimate source of strongyle infection for the foals. (4) No methods of animal management or hygienic practice in use at the six farms were sufficient in themselves to control worm infections. Control of worm infections at the nurseries surveyed in 1948 was found to be absolutely dependent upon efficient use of anthelmintics. The drug of universal choice for treatment of strongyle infections was phenothiazine. (5) It was found that a method of regulated treatment of mares by feeding low-level doses of phenothiazine the first 21 days of each month was most successful in worming mares, and in preventing heavy contamination of pastures with worm eggs and subsequent heavy strongyle infection of the foals. The effects of low-level phenothiazine therapy (including possible cumulative effects) upon horses are still under investigation. The effect of low-level phenothiazine upon a mare's ability to reproduce and to produce normal foals is not now known.

SARKKIA, A. (1946.) **Onchocerca cervicaliksesta ja sen esiintymisestä suomalaisen hevosen niskajänteessä.** [*Onchocerca cervicalis* and its occurrence in the ligamentum nuchae of

Finnish horses.—*Suom. Eläinlääkäril.* 52.
213–226. [Swedish summary.] 2834

The ligamentum nuchae of each of 120 Finnish horses was examined during 1943–44 and 87 % of them were found to harbour *Onchocerca cervicalis*. This is the first time the parasite has been reported to occur in Finnish horses.

—GUSTAV NAERLAND.

MEYER, M. C., & WITTER, J. F. (1950.) **The giant kidney worm (*Diectophyma renale*) in mink in Maine. With a summary of recent North American records.**—*J. Amer. vet. med. Ass.* 116. 367–369. 2835

The first occurrence of *Diectophyme renale* in Maine and Kentucky is recorded from the kidney of a mink and dog respectively. The authors refer briefly to cases of infection with this parasite which have been recorded in the U.S.A. and Canada since 1934.—M. L. CLARKE.

TETLEY, J. H. (1949.) **Rhythms in nematode parasitism of sheep.**—*Bull. Dep. sci. industr. Res., N.Z.* No. 96. pp. 214. 2836

The material presented is divided into seven parts:—

I. *The Cycle of Infection in a Small Isolated Flock as shown by Numbers of Eggs in Faeces.*

A small flock was studied by means of a regular examination of faeces, counting the eggs present and identifying them by plotting lengths and breadths on a scatter diagram. It was concluded that re-infection did not occur with *Nematodirus* and *Trichuris* but it did with *Haemonchus*, *Cooperia*, and *Strongyloides*. It was not possible to differentiate between the eggs of *Ostertagia* and *Trichostrongylus*. The free living stages of *Nematodirus* overwintered on the pasture, but with other species contamination of the pasture occurred throughout the year.

Ewes became susceptible to re-infection, mainly with *Ostertagia* and *Trichostrongylus*, and this was associated with reproduction and lactation.

II. *The Role of the Pregnant or Lactating Ewe in contaminating Pasture with Eggs.*

In pregnant ewes the egg counts of *Haemonchus* and *Ostertagia* declined in early pregnancy but rose in the early part of lactation in the spring. Only few eggs of *Nematodirus*, *Trichuris*, and *Capillaria* were passed by the ewes.

III. *Early Life Parasitism in Lambs compared with that found in their Mothers as shown by Numbers of Eggs in Faeces.*

The appearance of the eggs of *Strongyloides*, *Ostertagia*, *Haemonchus*, and *Cooperia* in the faeces of the lambs was correlated with the presence of these species in the ewes. The eggs of *Strongyloides* and *Ostertagia* appeared earlier than those of

Haemonchus and *Cooperia*. It is concluded that the ewes were insignificant as vectors of *Nematodirus* and that the infection in the lamb originated from free living stages spread by lambs during the previous season.

IV. *The Process of Parasitism in Lambs during Early Life as shown by Post-Mortem Examination.*

Over a period of two months an entire flock of 167 lambs were slaughtered at approximately 72 lb. live weight. Seasonal conditions of exposure to parasitism appeared to be of greater significance than age differences in determining the intensity of infection. It was concluded that *Haemonchus*, *Ostertagia*, *Cooperia curticei*, and possibly *Trichostrongylus axei* were spread by adult sheep grazing with the lambs and that *Cooperia oncophora*, *C. macmasteri*, and possibly *T. axei* were spread by cattle. It was considered that *Nematodirus* was carried over on the pasture from a flock of lambs that grazed the area eight months previously. Rainfall resulted in a subsequent rise in infestation, but with some species there was a decline in population which may have been due to a stimulation of a defence mechanism by infective larvae.

V. *Comparison of Epidemics in Neighbouring Flocks of Lambs.*

The main events of the epidemiological cycles of species in the two flocks tended to coincide despite flock differences in intensity of infection. Periods of rainfall and frosts were responsible for some of the changes observed.

VI. *The Process of Parasitism in Previously Uninfected Lambs during the Autumn and Winter.*

A flock of spring lambs reared under worm-free conditions were exposed to infection in the field in three experiments in the late summer, autumn, and winter. Each group of lambs was killed over a period of a few weeks. Heavy infections with *Haemonchus*, *Cooperia curticei*, *C. oncophora*, and *C. macmasteri*, occurred in the late summer exposed group. Infections with *Ostertagia*, *Nematodirus*, and *Trichostrongylus* were moderate to low. Average numbers of *Strongyloides*, *Trichuris*, *Chabertia*, and *Oesophagostomum venulosum* were present. The low infections with *Ostertagia*, *Nematodirus*, and *Trichostrongylus* were attributed to the absence of lambs from the paddock during the spring and early summer. Light infections with all species in the autumn and winter exposed groups were due to the unfavourable effects of the dry autumn and frosts respectively.

VII. *The Process of Elimination of Nematodes from a Lamb.*

The faeces passed by a grazing lamb were collected over six months and examined for adult parasites.

Process of elimination was rhythmical; in

many instances several species were eliminated together indicating a non-specific agency which was superimposed on the acquired resistance mechanism.

Particularly in *Nematodirus* it was possible to recognize sub-cycles in which egg counts rose to a peak which was followed by a decline associated with which large numbers of worms were eliminated. There was some evidence of re-infection. Successive sub-cycles diminished in length and this was a demonstration of an increasing immunity. Daily egg output and the number of worms eliminated tended to fluctuate directly with the daily faecal output in both *Nematodirus* and *Haemonchus*.

The total population found in the faeces was not greatly different from that usually seen at P.M. examination indicating that the turnover of parasites was not rapid.—L. K. WHITTEN.

JENNINGS, A. C. (1949.) **The biochemical characterization of a serologically active lipid fraction of the nematode *Haemonchus contortus*.**—*Aust. J. sci. Res. Ser. B.* 2. 408–420. [Author's summary copied *verbatim*.] 2837

Protein, polysaccharide, and lipid fractions were prepared from *Haemonchus contortus*. The lipid fraction appeared to be the only one essentially concerned in reactions with natural antisera from sheep, and further work was carried out to determine the nature of the serologically active lipid. It was found to be hydrophilic, acidic, susceptible to oxidation, free from protein and polysaccharide, and to have a molecular weight greater than 1000. Its biochemical significance role in the activity of the boiled antigen, and possible relation to other lipoidal antigens are discussed.

DIKMANS, G. (1948.) **Another case of guinea worm, *Dracunculus* sp., infestation in a dog in the United States.**—*Proc. helminth. Soc., Wash.* 15. 39–40. 2838

D. received the posterior portion of a worm (24 cm. long) which was removed from the hind leg of a two-year-old dog kept in North Carolina. The only reported symptom was local swelling of the affected limb. Since the portion of worm and the larvae it contained resembled in structure *D. medinensis*, the part-specimen was considered to be a *Dracunculus* sp.

A host and distribution list of mammals parasitized by guinea worms in North America is given.—FERGUS S. McCULLOUGH.

SPRENT, J. F. A. (1950.) **On the toxic and allergic manifestations caused by the tissues and fluids of *Ascaris*. II. Effect of different chemical fractions on worm-free, infected**

and sensitized guinea pigs.—*J. infect. Dis.* 86. 146–158. [Author's summary copied *verbatim*.] 2839

Guinea pigs were injected intravenously with various ascaris tissues and fluids and also with different chemical extracts prepared from whole worm pulp. In nonsensitized worm-free guinea pigs a toxic effect resembling anaphylactic shock was observed following injection of the supernatant fluid from centrifuged worm pulp in doses of about 1 g/kg. body weight. Removal of proteins by protein precipitants, boiling and complete digestion by pepsin removed this toxic activity, suggesting that the toxic substance is a protein. It was not removed by dialysis. Some dyspnea was caused by the deproteinized extracts, and this latter effect may have been caused by products of protein hydrolysis as it was more marked after partial digestion with pepsin. When ascaris body fluid and whole worm pulp were left at room temperature for 18 hours, an increase in toxicity occurred which may have been due to such substances released by proteolytic activity.

Guinea pigs could be sensitized with ascaris body fluid by intravenous, intraperitoneal and subcutaneous injection, while inhalation of a mist of body fluid, oral administration and rubbing on to the abdominal skin failed to produce sensitization. Allergic reactions could be obtained only by intravenous injection and in one case by inhalation. Oral, subcutaneous and intraperitoneal administration failed to produce any effect. Guinea pigs sensitized to ascaris body fluid were successfully shocked with ascaris extracts deproteinized by trichloroacetic acid but not after phosphotungstic acid precipitation.

Guinea pigs infected with the larvae of *Ascaris lumbricoides*, *Parascaris equorum* and *Trichinella spiralis* and with nematodes of the genus *Paraspirododera* were found to be hypersensitive to ascaris body fluid. Whole worm and deproteinized extracts of *A. lumbricoides*, isolated ascaris tissues and metabolic products; whole worm preparations of adult *A. columnaris*, *Toxascaris leonina* and *Physaloptera maxillaris*; and guinea pig lung containing ascaris larvae all caused anaphylactic shock in guinea pigs infected with *A. lumbricoides*. Pneumococcus polysaccharides, hemolyzed group A erythrocytes, normal guinea pig kidney and lung, hyaluronidase and hyaluronic acid preparations, and whole preparations of *Macracanthorhynchus hirudinaceus*, *Moniezia expansa*, oligochaete worms and a planorbid snail failed to produce shock. Guinea pigs infected with *T. spiralis* were successfully shocked with whole worm and deproteinized ascaris extracts.

Regarding the chemical nature of the substance causing shock in infected animals, it appears

possible that both protein and polysaccharide are involved. The occurrence of widely distributed immunologically related polysaccharides is discussed in connection with their possible role in instigating cross sensitization in infections with

various helminths. The importance of finding a means of analyzing the metabolic products of helminth parasites is stressed, insofar as such studies may assist in discovering more specific antigens for use in allergic methods of diagnosis.

See also absts. 2821-2 (immunization against ascarid larvae); [2879-80 (*Litomosoides carinii*, *Dirofilaria immitis* and *Wuchereria bancrofti*); 2980 (worm ova in faeces); 2949 (report, East of Scotland College of Agriculture); 2951 (report, N. Ireland); 2952-4 (reports, Australia); 2959 (report, S. Rhodesia).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

PRIOUZEAU, M. (1949.) Cancer du foie des bovidés. [**Cancer of the liver in cattle.**]—*Rec. Méd. vét.* 125. 19-27. 2840

This is essentially an account of the clinical condition that the author has found to arise from neoplastic disease of the liver of cattle, based on 11 cases observed in the course of 30 years' practice. Ten of these 11 cases were in cows, the age of affected animals varying from 9 to 14 years. In one case only was there evidence of pre-existing lesions of distomatosis. Three stages in the evolution of the typical clinical disease, which led to death in 4-12 months, are described. In the first, there was anaemia and progressive wasting. In the second, there was weakness and fatigue, a subicteric conjunctiva, and disturbed defaecation—the animal eating normally, but voiding less: the faeces were sometimes paler than normal, fatty, and appeared "over digested" from their prolonged stay in the alimentary tract. Urine was passed in frequent small quantities. There might be external evidence of increased liver size, and rectal examination revealed a marked increase in the size of the kidneys, apparently associated with neoplastic embolism of these organs. This second stage might last 2-6 months. In the third stage there was cachexia, diarrhoea, and inability to rise. Sometimes there was pyogenic involvement of the neoplastic tissue, leading to a local or general peritonitis, or to the development of a fistula opening into the reticulum. The tumours were classified as adenoma, sarcoma, or sarco-fibro-adenoma.—E. COTCHIN.

MULLIGAN, R. M. (1949.) Neoplastic diseases of dogs. I. Neoplasms of melanin-forming cells.—*Amer. J. Path.* 25. 339-355. 2841

In a collection of 36 melanomata from 31 dogs, 19 were malignant in type, the remainder benign. The majority was found in animals 6-14 years old, and the breeds chiefly affected were those with the more deeply pigmented skins. This is in contrast to the human melanoma which appears more often in fair-skinned races.

The predilection sites appeared to be the eyelids and the cheeks, and in a lesser degree the

remainder of the head, thorax, and extremities. In four dogs multiple primary melanomata were noted.

The author lists the criteria for determining malignancy in these tumours and includes a review of the literature on the subject.

—I. W. JENNINGS.

SHARPLESS, G. R., DAVIES, M. C., & COX, H. R. (1950.) **Antagonistic action of certain neurotropic viruses toward a lymphoid tumor in chickens with resulting immunity.**—*Proc. Soc. exp. Biol., N.Y.* 73. 270-275.

[Authors' conclusions copied *verbatim*.] 2842
RPL-12, a transplantable lymphoid tumor of chickens can be caused to regress, without any apparent damage to the host, by superimposed inoculations of Russian Spring-Summer, West Nile, Japanese B encephalitis, St. Louis encephalitis or louping-ill viruses. Chickens which have been inoculated with the RPL-12 tumor followed by a superimposed infection with any of the 5 viral agents are rendered immune, as a rule, to challenge by homologous tumor even though the original inoculation with tumor may not have produced a palpable tumor. The infective titer of RSS virus in infected tumor tissue is equal to that of infected mouse brain. RSS virus obtained from infected mouse brain has a high oncolytic action when introduced into the tumor area but is less effective when it is introduced at a distance from the tumor. RSS virus obtained from infected RPL-12 tumor has a high oncolytic action when introduced either in the tumor area or at a distance from the tumor.

I. MANN, I. (1949.) **Effect of low temperatures on the Bittner virus of mouse carcinoma.**—*Brit. med. J.* July 30th. pp. 251-253. 2843

II. MANN, I. (1949.) **Effect of repeated freezing and thawing on mouse carcinoma tissue.**—*Ibid.* 253-255. 2844

I. When mammary carcinoma tissue was frozen at -79°C . for periods varying from 15 min. to 182 days, the tumour cells were killed and the Bittner virus was liberated in its active form. The longer the freezing the higher the percentage of tumours obtained on transplantation, which

suggested the slow liberation of the active virus and also perhaps the denaturing of an inhibitory substance by cold. The refrigerated tissue produced tumours in male mice without oestrin as readily as in female mice, but only when injected into mammary tissue, thus demonstrating its selective infectivity in contrast to living tumour cells, which can be grafted in any situation.

II. The active agent of mouse mammary cancer gradually loses its infectivity after repeated freezing and thawing. Individual strains vary in

See also absts. 2951 (report, N. Ireland); 2966-7 (books).

NUTRITIONAL AND METABOLIC DISORDERS.

GORDON, J. E., & LE RICHE, H. (1950.) **The epidemiologic method applied to nutrition.**—*Amer. J. med. Sci.* **219**. 321-345. [Authors' summary copied *verbatim*.] 2845

Field studies in nutrition initially were concerned almost solely with food consumption and its relation to the health of populations. The method was the dietary survey.

The identification of specific nutrients and the better definition of nutritional disease entities led to a second phase in field activities, where the chief concern was with the prevalence of individual dietary deficiencies and of specific nutritional disorders. Laboratory tests were incorporated into field practice, and clinical methods attained a new level of importance and an added perfection.

A third phase in the direction of field interests is the current tendency to broaden the nutritional survey and to use it as the foundation for a general health survey. The concern is less with nutritional disorders and the nutritional state as such, and more with the part they have in determining the character and behaviour of other mass disease which is increasingly appreciated as material. Nutrition thus follows the course of most other fields: an initial emphasis on its own individual problems and an eventual incorporation of those interests into the general pattern of medical and epidemiologic effort toward health and welfare of populations. In the case of nutrition, it is actually a return to the original objective of the dietary survey, but with much better methods and a greater promise of accomplishment.

KRATZER, F. H., WILLIAMS, D. E., & MARSHALL, B. (1950.) **The relation of lysine and protein level in the ration to the development of feather pigment in turkey poults.**—*Poult. Sci.* **29**. 285-292. 2846

When rations that were deficient in lysine were fed to turkey poults, the feathers which were developing had an absence of pigmentation. The presence of these white bars was used as a criterion

their resistance to this treatment, some being completely inactivated by a second thawing, others deteriorating progressively on subsequent thawings. In this respect the Bittner virus seems to be less thermostable than the sarcoma virus which will withstand repeated freezing and thawing. It was noted that after two or even three thawings, when the carcinoma virus remained active, the appearance of the tumours in experimental mice was delayed with each successive thawing.

—I. W. JENNINGS.

of the adequacy of lysine in the diet. The requirements were increased when the protein level of the diet was raised. Deficiency of arginine or sulphur-containing amino acids did not cause the pigmentation failure but other amino acids may be involved besides lysine.—E. EDEN.

AXELSSON, J., & KIVIMÄE, A. (1949.) **The influence of some mineral salts on the metabolism of ruminants.**—*Kgl. Lantbrukshögsk. Ann.* **16**. pp. 101-113. [In English.] 2847

In cows given 35 g. of phosphorus supplement in the form of common disodium phosphate, anhydrous disodium phosphate, monosodium phosphate, or dicalcium phosphate for several weeks there was no indication of diarrhoea or significant variation in the pH of the urine. If, however, the feeding of AIV silage was increased to 20-25 kg. per cow per day, disodium phosphate was the most satisfactory of the compounds listed above for producing an alkaline urine. Calcium carbonate was similarly effective. The use of these two salts together was better than that of dicalcium phosphate. Previous claims in the literature that calcium carbonate decreases the digestibility of the organic matter in AIV silage was not confirmed in trials on three wethers.—E. EDEN.

McNAUGHT, K. J. (1948.) **Cobalt, copper and iron in the liver in relation to cobalt deficiency ailment.**—*N.Z. J. Sci. Tech.* Sect. A. **30**. 26-43. 2848

A survey of the cobalt content of livers of sheep and cattle was made as reference data for the diagnosis of cobalt deficiency disease. Samples were obtained from (a) healthy animals from districts where cobalt deficiency is not known to occur, (b) healthy, treated animals from cobalt-deficient areas, (c) "bush-sick" animals, *i.e.*, those from a cobalt-deficient area, with symptoms consistent with cobalt deficiency, and (d) animals with other diseases.

Animals were selected from all age groups

from birth to maturity, since the normal liver cobalt content varies significantly with age. Most samples were also analysed for iron and copper content, since "coast disease" in South Australia is a combined copper and cobalt deficiency disease, and both this and enzootic marasmus in West Australia were accompanied by high iron content of the liver. The chemical methods used for cobalt, copper, and iron determination are described and the results are given in six extensive tables.

There is a fair correlation between both cobalt concentration and total cobalt of the liver and incidence of bush sickness. Evidence is provided that the correlation is with cobalt deficiency disease and not with unthriftiness. Some low figures have been found for apparently healthy animals from marginal deficiency areas.

While both cobalt concentration and total cobalt correlate well with the incidence of bush sickness, the former figure is adequate in most cases for the purpose of diagnosis.

The diagnostic criteria based on the results obtained are as follows:—in sheep three months of age and older, below 0.06 p.p.m.—deficiency, above 0.10 p.p.m.—adequate cobalt; under three months of age, below 0.04 p.p.m.—suspected deficiency, above 0.08 p.p.m.—adequate cobalt. In cattle nine months of age and older, below 0.05 p.p.m.—deficiency, above 0.12 p.p.m.—adequate cobalt; under nine months data inadequate, but lower levels are indicated, especially in new-born calves.

The copper content of livers from typical bush-sick sheep is somewhat higher than normal for New Zealand and very much higher than typical examples of enzootic marasmus or coast disease. Some accumulation of iron occurs in the liver in bush sickness, but this is much less than in enzootic marasmus and coast disease.—J. B. SWAN.

EWER, T. K., & SELLERS, K. C. (1950.) **Aphosphorosis in young cows in East Anglia.**—*Vet. Rec.* 62. 343–345. [Authors' summary slightly modified.] 2849

The occurrence in East Anglia is reported of aphosphorosis in a herd composed mainly of down-calving heifers. The condition was characterised by hypophosphataemia, associated with lameness, unthriftiness, inappetence and scouring. The condition occurred during the winter and apparently was due to a diet low in both phosphorus and protein. Recovery of normal blood phosphorus values and remission of the clinical symptoms occurred shortly after the institution of phosphorus supplementation by means of 2 oz. boneflour to each animal per day. Some evidence is presented which indicates that a massive single dose of vitamin D₂ (50 mg. calciferol orally) hastened the

return to normal of the blood inorganic phosphorus level.

McCLURE, F. J. (1949.) **Fluorine and other trace elements in nutrition.**—*J. Amer. med. Ass.* 139. 711–716. 2850

This is an extensive discussion of the recent advances in knowledge of the importance of several trace elements (fluorine, manganese, cobalt, zinc, and boron) in nutrition. The effects of deficiency, when known, and of the excess of these elements are discussed. Several interesting radioactive studies concerning absorption, distribution, and excretion are also reported.—E. EDEN.

PENSACK, J. M., BETHKE, R. M., & KENNARD, D. C. (1949.) **Some properties of an unidentified growth factor present in fish products.**—*J. Nutrit.* 37. 353–360. 2851

The essential chick growth factor (or factors) present in sardine fish meal and condensed sardine fish solubles was extracted from both by 80 % ethanol, and was soluble in 75% acetone but insoluble in *n*-butanol. Activated charcoal, Darco-G 60, adsorbed the factor at pH 3.0 from a water solution of an 80 % ethanol extract, but was unable to adsorb the factor from an 80 % ethanol solution. The factor could be eluted with 10 % ammonium hydroxide in 95 % ethanol, with about 20 % loss of activity. The pigments present in the crude extracts were adsorbed, leaving the active material in a colourless filtrate. Precipitation of inert material was obtained by adjusting the pH of the solution to 3.0, the factor remaining in solution, from which it was precipitated by saturated ammonium sulphate.—E. COTCHIN.

NIELSEN, G. K., & THORDAL-CHRISTENSEN, A. (1949.) En lammelsestilstand hos grise, der formentlig skyldes mangel på vitamin B₁. [Paralysis in pigs resulting from vitamin B₁ deficiency.]—*Nord. Vet.-Med.* 1. 324–337. [English summary.] 2852

In Jutland from 1936 onwards a nervous disorder was observed in pigs, about ten weeks old and weighing about 20–25 kg. at about two weeks after weaning when they had been fed large quantities of coarse fodder, boiled potatoes, and sugar beet. Two to three days before the appearance of nervous symptoms there was unsteadiness of gait and incoordination followed by complete paralysis, listlessness and dyspnoea. The voice first became hoarse and later paralysed.

P.M. findings included a flabby heart with pale musculature, reddish-yellow transudate in the pericardium, and the liver was congested and enlarged.

Thiamine hydrochloride injections given parenterally 50–75 mg. repeated several times at

intervals of a few hours were beneficial in pigs that were treated early, before the paralytic stage was reached.

The authors suggest that the nature of the disease may be similar to that of beriberi.—F. E. W.

I. KINNEAR, T., & HUNTER, R. B. (1950.) **The therapeutic potency of vitamin B₁₂ derived from *Streptomyces griseus* culture liquors.**—*Edinb. med. J.* 57. 65–71. 2853

II. GIRDWOOD, R. H. (1950.) **Vitamin B₁₂ and related factors: a clinical and experimental review.**—*Ibid.* 72–109. 2854

I. Vitamin B₁₂ isolated from *S. griseus* was administered to 34 cases of pernicious anaemia, about half of whom had been previously treated with liver extracts. Each patient was given 20 µg. every three weeks for six months. This treatment was satisfactory in improving the haematological picture but not the nervous lesions; such cases may require treatment at a very early stage.

II. The following factors involved in pernicious anaemia are discussed: the extrinsic and intrinsic factors, liver, and other antipernicious anaemia preparations, yeast, folic acid, vitamin B₁₂, and animal protein factors. The experimental production of megaloblastic anaemias in animals is also mentioned. The second half of the review is concerned with the chemical, physiological and clinical properties of vitamin B₁₂, the change it undergoes in the body and its relation to folic acid.
—E. EDEN.

CLARK, P. F., MCCLUNG, L. S., PINKERTON, H., PRICE, W. H., SCHNEIDER, H. A., & TRAGER, W. (1949.) **Influence of nutrition in experimental infection.**—*Bact. Rev.* 13. 99–134. 2855

After a general introduction, in which the authors suggest "ground rules" that should be observed in animal experiments on the influence of nutrition on susceptibility or resistance to infec-

tions, individual authors review under separate headings recent studies in various fields. Schneider deals with the genetic basis of nutrition effects in natural resistance to infection, Trager with the influence of nutrition on resistance to experimental infections with helminth and with protozoan parasites, McClung with nutrition and susceptibility to experimental bacterial infections, Pinkerton with the influence of nutrition in resistance to experimental rickettsial infection, Price with the effect of nutritional factors on the relationship between the bacteriophage and its host, and Clark with the influence of nutrition on experimental virus infection. There are 151 references. The authors suggest that any attempts at present to generalize from the results of the experiments dealt with would be premature.—E. COTCHIN.

BENNETTS, H. W. (1950.) **Urinary calculi of sheep in Western Australia.**—*J. Agric. W. Aust.* 27. 129–137. [Author's summary slightly modified.] 2856

Present knowledge of the occurrence, signs, and possible causes of urinary calculi in sheep is briefly reviewed, and the limited existing knowledge of this condition in Western Australia is presented and discussed in relation to findings elsewhere.

Urinary calculi, and the resultant urinary obstruction, are known to be the source of serious economic losses in the Eastern Agricultural Districts of Western Australia where an investigation of the problem has been commenced. Evidence so far obtained indicates that two types of calculi, namely calcium carbonate and siliceous, are responsible for the condition in that region. Brief reference is made also to the occurrence of two distinct types of urinary calculi which result from extensive grazing on two specific plants namely Parakeelia (*Calandrinia* spp.) and subterranean clover (*Trifolium subterraneum*.)

See also absts. 2950 (report, Hannah Dairy Research Institute); 2951 (report, N. Ireland); 2952–4 (reports, Australia); 2957 (report, S. Rhodesia).

DISEASES, GENERAL

GEURDEN, L. M. G., & THOONEN, J. (1950.) **Onderzoekingen over Round Heart Disease. [Round Heart Disease.]**—*Vlaam. Diergeneesk. Tijdschr.* 19. 29–39. [Abst. from English, French, and German summaries.] 2857

The authors give the results of observations on 39 cases of round heart disease in fowls. There was no correlation between this disease, the breed concerned, or the period of the year in which the cases were found. The disease has its origin in bacterial embolus in the heart muscle. No single causal bacterium has been incriminated but

Salmonella pullorum, *Erysipelothrix (Listeria) monocytogenes*, and *Bact. coli* have been regarded as being possibly related to the disease. It is suggested that the host has some degree of immunity to the causal agent and that the lesion is, to some extent at least, an allergic reaction. It is stated that localization in the heart is purely incidental and that the bacterial embolus can occur in other organs, such as the gizzard, in which case the heart lesion does not develop.

Histologically the affected heart-tissues are in a state of fatty degeneration, lymphocytic infiltration

following the fatty changes, with consequent necrobiosis and atrophy. Later there is histiocytic proliferation, leading to sclerosis and angiofibrosis. When the lesion affects a large part of the heart muscle the healthy part of the heart tissue undergoes compensatory hypertrophy sufficient for maintaining a body at rest but insufficient when any call is made on the heart.

JULIAN, L. M. (1950.) Studies on the subgross anatomy of the bovine liver. II. The pathology of telangiectasis as demonstrated by the vinylite-corrosion technique.—*Amer. J. vet. Res.* 11. 166–172. [Author's summary slightly modified.] 2858

Gross, subgross, and microscopic observations of lesions of telangiectasis, as seen in the San Francisco Bay region, are reported.

The results of subgross studies demonstrate that telangiectasis is limited to the hepatic portal system. Vascular injections demonstrate that the lesions of telangiectasis are not restricted to sinusoids. By enumerating the branches of the hepatic portal vein, it has been demonstrated that well-formed lesions may involve intralobar branches of the portal vein as large as the third order of size. Correlation of subgross and microscopic studies demonstrate that telangiectasis arises as a result of parenchymatous degeneration which may be due to varying causes. The dilation of the blood-vessels is a secondary reaction.

A second type of telangiectasis is described in fluke-infected livers, giving further evidence that telangiectasis is but a pathologic classification and may arise from various causes.

From the standpoint of pathology and incidence, there is no discernible correlation between telangiectasis and "sawdust liver" in the San Francisco packing area.

TULLIS, J. L. (1949.) Radioresistant cells in certain radiosensitive tissues of swine exposed to atomic bomb radiation.—*Arch. Path.* 48. 171–177. 2859

This is a report upon the morphological changes noted in the radio-sensitive tissues of the pigs (aged 3 to 3½ months) that had been exposed

See also absts. 2856 (urinary calculi in sheep); 2949 (report, Scotland); 2952–4 (reports, Australia); 2975 (report, S. Rhodesia).

POISONS AND POISONING

O'CONNOR, J. G. (1948.) Suspected phenothiazine poisoning in horses.—*Irish Vet. J.* 2. 220–221. 2860

Brief clinical descriptions are given of two suspected cases of phenothiazine poisoning, both occurring in spring.

The first case was in a Thoroughbred stallion 16 years old that had previously tolerated several

to "atomic" radiation during the experimental bombing at Bikini.

Following irradiation there is found to be a prompt reduction in the numbers of circulating lymphocytes and in the lymphocyte population of the lymphoid organs. In the lymph nodes, destruction of the lymphocytes is contrasted with survival of the reticular cells. In both lymph nodes and spleen, however, the macrophages are not altered structurally and appear to be functioning hyperactively in order to comply with the increased amount of phagocytosis required. Evidence of erythrophagocytosis is found in most of the spleens and lymph nodes examined from animals dying on the second day or later after exposure.

In the bone marrow the blast cells of both the red and white cell series are extremely radio sensitive, and the mature cells less so. The elementary stem cells appear to be left intact. The intestinal epithelium shows a variety of changes, including complete destruction, with ulceration of the muscularis mucosae, at isolated sites in the large and (less frequently) the small intestine. The lymphocytes in the lamina propria are greatly diminished, whereas there is not any apparent damage to fibrocytes and plasmacytes.

In the testes, most of the spermatogonia and spermatocytes have disappeared within five days of lethal total body irradiation. The cytoplasm of the granular cells and the amorphous interstitial material of the tubules is granular, stringy, and vacuolated. The undifferentiated cells lining the tubules next to the basement membrane appear unaltered in appearance and numbers. In the ovary the primordial ova seem to be more resistant than the developing ova.

There are therefore certain radio-resistant elements in the more radio-sensitive organs of the body, and contrary to the so-called law of Bergonie and Tribondeau (1906), that "primitive cells are more sensitive to radiation than specialized cells", it is in fact the stem cells that appear to be resistant. It would appear on histological grounds that, if treatment during the acute phase of atomic injury is successful in maintaining life, regeneration of radio-sensitive cells is possible.—ALASTAIR N. WORDEN.

doses of larger than 15 g. About one-half oz. of phenothiazine was administered. The animal was reported sick 48 hours later. 0.5 gr. of strychnine was given twice daily for five days. Apparent recovery after 14 days was followed by a relapse, but eventually the animal returned to normal.

The second case was in a Hunter gelding six years old, which developed symptoms 24 hours

after consuming 1 oz. of phenothiazine. Rapid recovery followed the intravenous administration of glucose-saline solution.—A. N. WORDEN.

BARNETT, S. A., BLAXLAND, J. D., LEECH, F. B., & SPENCER, M. M. (1949.) **A concentrate of red squill as a rat poison, and its toxicity to domestic animals.**—*J. Hyg., Camb.* **47.** 431–433. [Authors' summary copied *verbatim*.] **2861**

A preparation containing 0·7 % scilliroside (the glucoside of red squill) has been tested as a poison for *Rattus norvegicus* and *R. rattus*. The preparation has been found to be effective in the field against *norvegicus* but not against *rattus*. Assayed against a strain of white rats, the preparation had an LD50 for males of about 25 mg./kg., and for females of about 5 mg./kg. The LD50 for adult Rhode Island Red fowls was greater than 400 mg./kg. Pigs, dogs, and cats were treated with doses up to 16 mg./kg. without fatal results.

Silmurine [a proprietary name for scilliroside] was unpalatable to pigs, dogs and cats, but fowls readily consumed a mash containing 1 % Silmurine.

PULSFORD, M. F. (1950.) **A note on lameness in cattle grazing on tall meadow fescue (*Festuca arundinacea*) in South Australia.**—*Aust. vet. J.* **26.** 87–88. **2862**

Observations in South Australia are recorded which support Cunningham's suggestion [see *V.B.* **19.** 563] that "fescue foot" is due, not to ergot, but to a toxic principle contained in *Festuca arundinacea*.

In South Australia the disease is rare in the summer, but is prevalent from May to October, particularly when the grass is making its most rapid growth. The grass is toxic even when very few ergot sclerotia can be found on it or on the

ground, indicating that the disease is not an ergotism.

Lameness may develop within 3–10 days of grazing the fescue, followed by swelling near the fetlock of one or both hind limbs. Complete sloughing may occur below a line of demarcation in a limb, usually near the fetlock. If cattle are removed from the affected pasture at an early stage of the disease recovery is rapid; otherwise the disease runs its course. There is no evidence of sloughing of the fore limbs or tail, or of abortion. Cattle with no previous access to fescue are affected more rapidly than those which are accustomed to it.—J. M. KEEP.

GUILHON, J., & JULOU, L. (1949.) **L'image sanguine dans le syndrome hémorragique observé, en Bretagne, sur les jeunes bovins. [The blood picture in bracken poisoning of cattle in Brittany.]**—*Bull. Acad. vét. Fr.* **22.** 407–415. **2863**

A haemorrhagic condition of young cattle has been recognized in Brittany for many years where bracken is common. The condition is seasonal, occurring from May to August and is characterized by weakness, fever, epistaxis, and cutaneous haemorrhages. On P.M. examination, blood clots in the caecum and large intestine and haemorrhages on serous membranes are the usual findings, the spleen being normal. The condition has been mistaken for anthrax or blackleg, but all attempts to find an infective organism have failed. Blood smears from affected animals indicated intense agranulocytosis, anicytosis, and thrombopaenia, changes in the bone marrow were also noted. These findings are highly suggestive of an intoxication and there can no longer be any doubt that the condition is due to bracken poisoning.

—J. A. NICHOLSON.

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections, see under the appropriate disease)

HINGSON, R. A., & HUGHES, J. G. (1947.) **Clinical studies with jet injection. A new method of drug administration.**—*Curr. Res. Anaesth.* **26.** 221–230. **2864**

An account of the use of a special syringe that produces a jet capable of penetrating tissues. Injections with it are painless or almost so. It is important that the skin be dry and tensed at the site of injection and that the nozzle be pressed firmly against it at right angles and held there for two or three seconds after releasing the inoculum. Failure to observe these rules may result in loss of some inoculum or in the wounding of the skin by an oblique high-pressure jet. The dispersal of the inoculum was studied radiologically. One interest-

ing case was an 11-year-old girl whose diabetes was controlled for a fortnight with painless insulin injections. The instrument is expensive and the maximum dose delivered is only 0·25 ml. Dispersion of the inoculum is wide, which may lead to undesirably rapid absorption of some drugs, although this might be advantageous with others. Viscid fluids are not very suitable for injection by this technique. On the other hand, the absence or diminution of pain produced by the injection is a great advantage especially with children and for daily injections over long periods. As the drug is contained in a separate "cartridge" the instrument itself requires no sterilization and is very suitable for large-scale immunizations. Its use in anaesthesia

seems to be limited to raising the skin weal prior to the insertion of the needle for nerve block injection.—L. M. MARKSON.

BROWN, R. V. (1949.) **Evaluation of certain dangers in the use of jet injection technic.**—*Proc. Soc. exp. Biol., N.Y.* **70.** 507–509. 2865

Experiments on anaesthetized dogs revealed the possibility that the jet, administered by the method described in the preceding abst., might penetrate a major blood-vessel. It is stated, however, that with proper care the risk of its doing so should be very small.—L. M. MARKSON.

LONGLEY, E. O. (1950.) **Improved intravenous technique in the large animals.**—*Vet. Rec.* **62.** 15–16. 2866

An intravenous needle of the Lang pattern is advocated but with a record type mount and made of hard steel which takes and retains a keen edge. The two-way stopcock attached directly to the needle acts as a handle and is easily operated by the hand holding the unit to ensure that the needle is in the vein and then to allow the injection to take place. Afterwards the needle is cleared of the injection fluid before withdrawal by again opening the route *via* the side arm of the tap. The advantages of "polythene" plastic tubing are indicated. Using this tubing as a connexion between syringe and stopcock with needle a technique for intravenous injection of large animals without assistance is described.—K. G. TOWERS.

GOLDSTEIN, A. (1949.) **The interactions of drugs and plasma proteins.**—*J. Pharmacol.* **95.** No. 4., Pt. 2. 102–165. 2867

The existence of a drug-protein interaction may be demonstrated in many ways. The activity of a drug may be diminished when plasma is added to it. If a semi-permeable membrane divides a non-dialysable protein from a dialysable drug, an equilibrium state in which the drug concentration is greater on the protein side of the membrane indicates combination of the drug and protein. Ultrafiltration under pressure causes filtrable drugs to pass a membrane if they are not bound to a non-filtrable protein; if the substance bound is an electrolyte, conductivity and E.M.F. measurements record their removal by binding with protein. Alterations of osmotic pressure, vapour pressure, surface tension, or freezing-point may indicate interactions. A substance which normally adsorbs the drug may fail to do so in the presence of protein; the drug may become more soluble in the presence of protein; an unstable drug may be protected from breakdown by the presence of protein. The drug may migrate with a protein fraction in electro-phoresis. The absorption spectrum of the substance may be altered in the

presence of protein. The drug may be found in a protein precipitate. There may be changes in such properties as viscosity, electrophoretic rate, enzyme activity, etc., of the protein; the protein may be stabilized towards denaturation by the drug. Fibrinogen and γ globulins either react more loosely than other protein fractions with small molecules or not at all.

Though α and β globulins are important as interactors with enzyme prosthetic groups, there are few drugs which interact with them. Albumin is the most important fraction for interaction with drugs. A factor affecting interaction in substituted carboxylic acids is length of the carbon chain, e.g. in fatty acids, penicillin, and the barbiturates; with increased length of chain there is increased interaction. Ionization is not apparently the major factor in binding-affinity of sulphonamides for albumin; steric interference in this and many other cases investigated plays an important role. Cardiac glucosides interact with albumin: the group concerned is not known but it is probably not the sugar residue. Streptomycin is bound weakly if at all to albumin.

The main pharmacological effect of protein interaction with drugs is to hold them in the bloodstream in inactive form.

Drug protein combinations appear to be available for tubular secretion in the kidneys and to be capable of removal by liver cells from the plasma. The prolonged persistence of certain drugs can be attributed to their binding with plasma protein.

Chemotherapeutic effects of drugs may be reduced or nullified if the protein binding is very great; persistence of an unbound fraction by gradual dissociation of the bound fraction may preserve a constant and prolonged therapeutic level in the blood. Certain drugs (or substances of no pharmacological importance) can displace other drugs from combinations with protein. There are species differences in binding power of plasma protein and also alterations in the power in certain pathological conditions.

Drugs bound by diazotization, peptide linkage, and even by contact alone, with protein are capable of producing allergic phenomena.—R. MARSHALL.

SCHWARTZ, B. S., & ERCOLI, N. (1950.) **Distribution of penicillin in the body by various treatment methods.**—*Amer. J. med. Sci.* **219.** 617–626. [Part of authors' summary copied *verbatim*.] 2868

It can be stated that the blood-level curve alone is far from representing the various conditions related to therapeutic effectiveness, tissue retention, absorption, and so on. The authors studied conditions under which penicillin was stored in certain

organs and was present in the cerebrospinal fluid, without noticeable increase in the time it was present in the blood. In rats given 5,000 units per 100 g. body weight of crystalline potassium penicillin G in aqueous solution, orally, subcutaneously or intramuscularly, the blood level duration was 2.5 hours; that in the liver, spleen and lung was shorter but that in the kidney was 4.5 to 5 hours. With 20,000 units given orally or subcutaneously, the duration in the blood was three hours while that in the kidney was 9–11 hours.

They then used penicillin in oil plus epinephrine—which they term “repository penicillin”—and the kidney levels were maintained for 24 and 40 hours respectively following doses of 5,000 or 20,000 units. Using dogs they found that in order to maintain the penicillin level in the cerebrospinal fluid doses of 30 or 40 thousand units per kg. aqueous penicillin must be given.

Penicillin in oil and a vasoconstrictor (which in its absorption pattern very closely resembles continuously repeated aqueous injections) might result in a better therapeutic utilization than the aqueous injections given at intervals currently used.

SEELEMAN, M., & NEUMANN, H.-J. (1949.) Die Technik der Penicillinbehandlung des gelben Galtes. [The technique of penicillin treatment in streptococcal mastitis.]—*Berl. Münch. tierärztl. Wschr.* No. 9. pp. 113–115. 2869

After milking out in the afternoon and thorough cleansing of the udder, 2.5 ml. penicillin in oil containing 25,000 Oxford units is injected into each quarter. The process is repeated at the same time on two consecutive days, a total of three doses being given.—R. MARSHALL.

SCHMIDT, L. H., WALLEY, A., & LARSON, R. D. (1949.) The influence of the dosage regimen on the therapeutic activity of penicillin G.—*J. Pharmacol.* 96. 258–268. 2870

It was confirmed that small but frequent doses of penicillin G, at intervals of less than eight hours, were more effective against rapidly developing pneumococcal infection of white rats than single massive doses. The beneficial effect of this regimen was not caused by the maintenance of a threshold level of penicillin in the blood. The inhibitory concentration was often maintained only for a short time after dosing.—E. EDEN.

HUIDOBRO, F., CROXATTO, R., & LUCHINI, A. (1950.) Prolongation of penicillin blood level by implantation of procaine penicillin tablets.—*Proc. Soc. exp. Biol., N.Y.* 73.

201–203. [Authors' summary copied *verbatim*.] 2871

Tablets of procaine penicillin implanted in the subcutaneous or muscular tissue provide a safe procedure for prolonging the penicillin serum blood level for several days.

HUGHES, D. L., & FARMER, R. K. (1950.) Studies on streptomycin in relation to its possible uses in veterinary practice.—*Vet. Rec.* 62. 265–270. [Authors' summary copied *verbatim*.] 2872

The comparative *in vitro* resistance of a number of bacteria to streptomycin has been studied and the order of descending resistance has been found to be as follows: *Streptococci*, *Salmonella*, *Erysipelothrix rhusiopathiae*, *Ery. monocytogenes*, *C. renale*, *Pasteurella*, *Bact. coli*, *Staphylococcus pyogenes*, *C. pyogenes*. Streptomycin has been administered to calves and cows by the intravenous, intramuscular and oral routes as well as by intramammary infusion. The levels of streptomycin in blood and milk obtained by these methods and data on its excretion in urine are given. The possible uses of streptomycin in bovine practice, based on these results, are discussed.

GRAY, J. D. (1950.) Observations on chloramphenicol.—*Lancet.* 258. 150–156. 2873

This is an account of a clinical trial of chloramphenicol (chloromycetin) in treatment of whooping-cough in two groups of children. The cases were too few for definite conclusions to be drawn but oral dosage schedules were worked out and the toxic reactions are given.—MALCOLM WOODBINE.

EATON, M. D. (1950.) Action of aureomycin and chloromycetin on the virus of primary atypical pneumonia.—*Proc. Soc. exp. Biol., N.Y.* 73. 24–29. 2874

Rats infected with the virus of primary atypical pneumonia and injected intraperitoneally with 1 mg. of aureomycin 24 hours later, the treatment being continued daily, developed no symptoms. If treatment was not commenced for 5–6 days, some success was achieved with doses of 2–5 mg. daily. The use of chloromycetin gave irregular results.—R. MARSHALL.

HERRELL, W. E. (1950.) Aureomycin.—*Amer. J. med. Sci.* 219. 570–580. 2875

The antibiotic aureomycin, isolated from *Streptomyces aureofaciens*, has a bacteriostatic and bactericidal action against many Gram-positive and Gram-negative organisms. It is the most versatile and important antibiotic since the discovery of penicillin. It has a low toxicity, it is easy to administer, and aureomycin resistant strains do

not develop frequently during a course of treatment.—E. EDEN.

SLAVIN, G., & MACLAY, M. H. (1947.) **Sulphonamide investigations. II. Treatment of experimental *Pasteurella septica*, *Ery. rhusiopathiae* and *S. cholerae-suis* infections in mice with sulphathiazole, sulphadiazine, sulphamezathine and sulphapyridine.**—*J. comp. Path.* 57. 209–217. 2876

Mice, in groups of 10 or 20, were infected intraperitoneally and treated with the sulphonamides *per os*, using three levels of dosage—approximately 1 mg. per g. per day, 0.25 mg. per g. per day, and 0.06 mg. per g. per day—except for sulphadiazine, which was toxic at the higher levels.

For *Pasteurella* infections the two higher dosages were effective; for *Erysipelothrix rhusiopathiae* no drug had any therapeutic effect, but for *Salmonella cholerae-suis* infection the highest dose of sulphamethazine, sulphapyridine, or sulphathiazole only delayed death. Sulphadiazine, however, was effective in protecting mice (32 days' observation) giving 70 and 60 % survivors on doses of 0.25 and 0.06 mg. per g. per day.

—MALCOLM WOODBINE.

ROLLO, I. M., WILLIAMSON, J., & LOURIE, E. M. (1949.) **Studies on the chemotherapy of melaminyl arsenicals and antimonials in laboratory trypanosome infections.**—*Ann. trop. Med. Parasit.* 43. 194–208. 2877

The following compounds were tested against laboratory infections with *Trypanosoma rhodesiense*: tryparsamide, melarsen and its antimony analogue, MSb (all pentavalent compounds), mapharside, butarsen, melarsen oxide and its antimony analogue MSb3 (all trivalent compounds). In the prophylactic studies suramin, pentamidine, and stibenyl were also included.

In treatment of infections in rabbits and mice melarsen and MSb were more active than tryparsamide; in mice, trivalent compounds were also tested and melarsen oxide and MSb3 were more active than the others.

These new compounds were also superior in establishing trypanocidal power in rabbit serum, this condition being dependent on the different rates of absorption and elimination rather than differences in the extent to which they were reduced in the circulating blood to their trypanocidally active derivatives. Melarsen conferred higher trypanocidal properties on the cerebrospinal fluid of rabbits than tryparsamide. MSb and the trivalent compounds were inactive.

In prophylactic studies on mice the longest protection was afforded by MSb (41 weeks); suramin (10 weeks) and pentamidine (2 weeks)

were less effective. In the light of these results, field trials of these new compounds are advocated.

—E. EDEN.

SUTTON, G. D. (1950.) **The prophylactic effect of antrycide methyl sulphate against *T. congolense* infection in guinea-pigs.**—*J. S. Afr. vet. med. Ass.* 21. 33–34. [Author's conclusions copied *verbatim*.] 2878

Antrycide methyl sulphate had a prophylactic effect against *T. congolense* in guinea-pigs for approximately three months. It prevented the development of a fatal disease, but there is a possibility that the guinea-pigs might be harbouring the trypanosomes in their bodies without being demonstrable.

I. PETERS, L., BUEDING, E., VALK, A. D., JR., HIGASHI, A., & WELCH, A. D. (1949.) **The antifilarial action of cyanine dyes. I. The relative antifilarial activity of a series of cyanine dyes against *Litomosoides carinii*, *in vitro* and in the cotton rat.**—*J. Pharmacol.* 95. 212–239. 2879

II. PETERS, L., WELCH, A. D., & HIGASHI, A. (1949.) **The antifilarial action of cyanine dyes. II. Selection of 1'-ethyl-3, 6-dimethyl-2-phenyl-4-pyrimido-2'-cyanine chloride (⌘863) for further study as a potential antifilarial agent.**—*Ibid.* 96. 460–471. 2880

I. Detailed studies were carried out on the effect of (1-amyl-2,5-dimethyl-3-pyrrole) (1,6-dimethyl-2-quinoline) dimethincyanine chloride (Chemotherapy Center ⌘ 348) on the filarial parasite *Litomosoides carinii* *in vitro*, and also *in vivo* as a parasite of the cotton rat. The dye interfered with the oxidative metabolism of the adult *L. carinii* and produced complete cures in infected rats if it was injected intraperitoneally for a few days. Over 100 other cyanine dyes were tested (the structural formulae of many of these are given) and it was found that the most active compounds contained a resonating amidinium ion system, in which a quaternary nitrogen was separated from a tertiary nitrogen by a chain of atoms, the members of which were joined by alternating single and double bonds.

II. Twelve cyanine dyes active against the filarial parasite *Litomosoides carinii* were administered orally, subcutaneously, intraperitoneally and intravenously to rats. Oral dosage was unsatisfactory; cures were produced following subcutaneous administration, but there was tissue injury at the site of injection. Intra-peritoneal administration was the most suitable route. Among the compounds studied, the best proved to be ⌘ 863; detailed data on the tolerance of this drug are also reported. The chemotherapeutic action of the cyanine dyes did not extend to all species of

filaria; it was ineffective against dog heart worm (*Dirofilaria immitis*) and against *Wuchereria bancrofti* in man.—E. EDEN.

SOKOLOVA, N. M., & LINNIKOVA, M. A. (1947.) **[Action of ascorbic acid on insulin and camphor shock in tuberculous animals.]—Zh. Mikrobiol., Moscow.** No. 9. pp. 81–83. 2881

Previous daily injections of 25 mg. ascorbic acid minimized the shock of injecting either 3–5 ml. 20 % camphor or 3.5 I.U. insulin into tuberculous g. pigs, six of 12 dying; while of another 12 which were not given ascorbic acid, ten died. —F. A. A.

SOFFER, L. J., SCHWARTZMAN, G., SCHNEIERSON, S. S., & GABRILOVE, J. L. (1950.) **Inhibition of the Schwartzman phenomenon by adrenocorticotrophic hormone (ACTH) from the adenohypophysis.—Science.** 111. 303–304. 2882

Meningococcus agar washings filtrate was used for intradermal injections into rabbits and after 24 hours when the same filtrate was injected intravenously, haemorrhagic necrosis occurred at the site of the intradermal injection. This could be prevented if 12.5 mg. of adrenocorticotrophic hormone was injected intravenously two hours before the second injection of the bacterial filtrate. Smaller amounts or treatment prior to the intradermal injections proved to be ineffective.

—E. EDEN.

TRENTIN, J. J., & TURNER, C. W. (1948.) **The experimental development of the mammary gland with special reference to the interaction of the pituitary and ovarian hormones.—Res. Bull. Miss. agric. Exp. Sta.** No. 418. pp. 3–48. 2883

Using the male mouse with rudimentary mammary glands as test animal, cattle anterior pituitary tissue was assayed for mammary duct growth activity. It was found that this activity was associated with the protein fraction and not with the lipid fraction; but it was not possible to identify independent mammary duct stimulating and alveolar stimulating fractions so that the existence of a duct mammogen as distinct from an alveolar mammogen is unlikely. It was confirmed that combined injections of oestrogen and progesterone were much more effective in producing mammary growth than either substance alone and that in the hypophysectomized animal such injections have little or no effect. Adrenalectomy was followed by rapid regression of alveolar tissue which was not restored by oestrogen injections. This indicates that, in the normal animal, oestrogens may stimulate the adrenal cortex since this is known to secrete steroids which induce mammary alveolar development.—J. A. NICHOLSON.

TANABE, T. Y., WARNICK, A. C., CASIDA, L. E., & GRUMMER, R. H. (1949.) **The effects of gonadotrophins administered to sows and gilts during different stages of the estrual cycle.—J. Anim. Sci.** 8. 550–557. 2884

When injections of 2,000 I.U. of P.M.S. (pregnant mare's serum) were given intramuscularly to sows during the luteal phase of the cycle, the effect was found to be largely if not solely follicle stimulating. Service of these animals confirmed that the semen is deposited into the uterus at this phase of the cycle. Injection of unfractionated sheep pituitary extract induced ovulation 36–48 hours later regardless of the phase of the cycle, but the average number of ovulations increased progressively as the cycle advanced. It was observed that a gelatinous plug forms in the oviducts which entraps the fertilized ova of the sow. On artificial insemination following P.M.S. injection, the greatest number of fertilized eggs were invariably found in sows injected during the follicular phase of the cycle.—J. A. NICHOLSON.

FOLLEY, S. J., GREENBAUM, A. L., & ROY, A. (1949.) **The response of the ovary of the anoestrus goat to pregnant mare's serum gonadotrophin.—J. Endocrinol.** 6. 121–131. 2885

The effect of single subcutaneous injections of pregnant mare's serum, on female goats weighing 45–200 lb. in the anoestrous season was studied over the period 1944–47. Regular testing with the buck after injection was instituted and all oestrous goats were mated. One hundred and sixty-eight hours after injection 67 animals including 11 un-injected controls were killed for histological study and recovery of ova. Seventy-five animals mostly from pedigree herds were studied for subsequent breeding performance. Out of 44 animals in the breeding group injected with 1,200 I.U. only 35 came into oestrus and of these only 10 gave birth to young. In the "acute" experiments (i.e. in the group not used for breeding) only 62.5 % of the eggs shed could be recovered from the fallopian tubes, and only four out of 87 eggs recovered were found to be dividing. 600 I.U. appeared to be the threshold dose as evidenced by an increased proportion of medium and large follicles, but doses of 1,000 I.U. or more were required to increase the mean diameter of the follicles and regularly to produce oestrus. Ovulation often occurred with doses as low as 200–400 I.U., sometimes with oestrus, but the higher dosage levels regularly evoked ovulation and frequently superovulation. Superfoetation was not encountered.—B. A. CROSS.

CHAMBON, Y. (1949.) **Absence d'influence sur l'implantation de fortes doses de progestérone**

chez la rate. [Failure of large doses of progesterone to influence implantation in the rat.]-*C. R. Soc. Biol. Paris.* 143. 753-756. 2886

In order to study the effect of large doses of progesterone on delayed implantation as occurs in rats, ovariectomy was performed 24 hours after coitus and daily injections of 2 mg. crystalline progesterone in oil were given. It was found, however, that even such massive doses did not hasten implantation which occurred at the normal time or not at all; nor was the duration of pregnancy or development of the fetuses interfered with.

—J. A. NICHOLSON.

DONIACH, I., & FRASER, R. (1950.) **Effect of resorcinol on the thyroid uptake of I^{131} in rats.**—*Lancet.* 258. 855-856. [Authors' conclusions copied *verbatim*.] 2887

Preliminary assessment of the antithyroid action of resorcinol on rats, using I^{131} to measure thyroid uptake, shows it to be similar to that of methyl thiouracil in all the respects tested—namely, the maximal depression of thyroid uptake of iodine which can be induced, the abolition of organic binding as evidenced by autoradiography, and the enhancement of its anti-thyroid effect obtainable by the additional injection of thiocyanate but not of methyl thiouracil.

FRANCIS, J., & PARRY, H. B. (1949.) **β -naphthoxyethanol: a new anaesthetic for use in the horse.** [Correspondence.]-*Vet. Rec.* 61. 509. 2888

The study of a new drug, β -naphthoxyethanol, indicated that it may be a useful short-acting anaesthetic for horses. As it is rapidly eliminated from the blood-stream, it must be given intravenously, the dose for a horse being 30 to 50 mg. per kg. body weight. Such dosage produces light surgical anaesthesia lasting 10-15 min. but anaesthesia may be reinforced with chloroform, chloral hydrate, or the barbiturates. As the drug is somewhat insoluble, it must be administered in the form of a 10 % w/v aqueous suspension. Its toxicity is low but its action is peculiar in that although cutaneous anaesthesia is good and voluntary movements of the limbs abolished, head and neck righting movements, eye movements, whinnying and hearing are still present though depressed. The drug is suitable only for horses and not for other domestic animals.

—J. A. NICHOLSON.

I. LONGLEY, E. O. (1950.) **Thiopentone (Pentothal sodium) as a general anaesthetic in the horse.**—*Vet. Rec.* 62. 17-20. 2889

II. LONGLEY, E. O. (1950.) **Thiopentone as an**

anaesthetic in the horse. [Correspondence.]

—*Ibid.* 82.

2890

I. On account of cost, barbiturates have not been extensively used as anaesthetics for large animals but consideration of the effects of the rapid injection of a quick-acting anaesthetic led L. to evolve a technique for the administration of thiopentone (pentothal sodium) whereby the dosage and therefore the cost is reduced by more than 50 %. The principles involved, which are discussed in some detail, require that the drug should be injected intravenously as rapidly as possible, the time not to exceed 10 sec. In robust animals the dose required is one tenth gr. per lb. body weight but debilitated animals require less. It was found advantageous to dissolve the required dose in a fixed volume (100 ml.) of fluid. In 26 trials with seven horses and 12 asses, surgical anaesthesia was satisfactorily maintained for 15-20 min. and there were no casualties. Apart from a man at the animal's head, no restraint is necessary as the animal assumes lateral recumbency in 15-20 sec. without the slightest excitement. Recovery returns first to the head and fore-limbs and is complete in 20-60 min.

II. Criticisms have been made concerning thiopentone as an anaesthetic in horses because the animals make repeated but unavailing attempts to rise during the recovery period. It is pointed out, however, that this is entirely due to the fact that power returns to the fore-limbs before the hind limbs and a horse assumes a "dog-sitting" posture. Simple measures of control are all that is necessary to prevent this and the anaesthetic should not be condemned for this reason

—J. A. NICHOLSON.

ARCHER, R. K. (1947.) **Pethidine in veterinary practice.**—*Vet. Rec.* 59. 401-402. 2891

Pethidine (ethyl-1-methyl-4-phenyl piperidine-4-carboxylate) is advocated as an analgesic for conditions associated with spasms of smooth muscle, *e.g.* strychnine poisoning and tetanus. Dosage levels for several species and the merits of different routes of administration are discussed.

—E. EDEN.

BURLINGTON, H., & LINDEMAN, V. F. (1950.) **Effect of DDT on testes and secondary sex characters of White Leghorn cockerels.**—*Proc. Soc. exp. Biol., N.Y.* 74. 48-51. [Authors' summary copied *verbatim*.] 2892

White Leghorn cockerels were subjected to injections of DDT beginning 8 days after hatching and continuing for as long as 89 days. The development of the comb and wattles was greatly inhibited as a result of the treatment. This effect is attributed to the marked retardation of the testes growth which was noted. These findings suggest that

DDT may exert an estrogen-like action in white Leghorn cockerels.

ANON. (1949.) **Residual toxicity of DDT.**—*S. Afr. med. j.* **23**. 394–395. [In Afrikaans & English.] 2893

As D.D.T. has a residual toxicity, it is

See also absts. 2755 (penicillin in *Str. agalactiae* infection); 2768 (diphenylmethane derivatives in TB.); 2769 (tubercle penicillinase); 2770 (testing antituberculous substances); 2808 (sulphaguanidine in *Eimeria tenella* infection); 2832 (phenothiazine); 2973 (book, sulphonamides).

PHYSIOLOGY, ANATOMY, AND BIOCHEMISTRY

BRODY, S., THOMPSON, H. J., KIBLER, H. H., & RAGSDALE, A. C. (1949.) **Some effects of ambient temperature, 0 to 105° F., on dairy cattle.**—*J. Anim. Sci.* **8**. 638. [Only abst. given; abst. from abst.] 2894

Optimal temperature for milk production was 80° F. At low temperatures, milk yield dropped but the fat content increased; food consumption was also increased. Generally small cows were more sensitive to low temperatures and large animals to high temperatures. If the environmental temperatures were increased from 80°–100° F., heat production, pulse rate, and blood cholesterol levels decreased. Results of the variation of rectal and surface temperatures and of the rate of vaporization with varying environmental temperatures are also described.—E. EDEN.

DURAN-JORDA, F. (1950.) **Secretion of red blood corpuscles as seen in the camel.** [Correspondence.]—*Nature, Lond.* **165**. 280. 2895

That the erythrocytes of certain mammalian species are derived from the granules of eosinophile polymorphonuclear leucocytes is a point of view which the author has often championed. Having examined sections of liver, spleen, and gastric and intestinal mucosa from a camel, he postulates that the theory is true in that species also.—L. M. MARKSON.

BONVALLET, M., & MOREL, E. (1950.) **Variations saisonnières de la composition sanguine chez le chien. Rôle du système supra-optico post-hypophysaire dans ces variations.** [Seasonal variations in the blood of dogs.]—*C.R. Soc. Biol., Paris.* **144**. 383–386. 2896

Thirty normal dogs were used and six dogs in which the pars nervosa of the hypophysis cerebri had been surgically destroyed. A direct relationship was found between packed cell volume, total blood proteins, and seasonal temperature. To only a limited extent was this the case in the partially hypophysectomized animals.

—L. M. MARKSON.

STEINBERG, B., & MARTIN, R. A. (1950.) **Plasma factor increasing circulatory leukocytes.**—

suggested that malarial control in rural areas should be effected mainly by an attack on adult mosquitoes. The cost of D.D.T. campaigns is influenced by the solvent used for its dispersal; it is generally considerably cheaper per head of population than the use of prophylactic drugs. —E. EDEN.

Amer. J. Physiol. **161**. 14–20. [Authors' summary copied *verbatim*.] 2897

Investigations described here indicate the presence of a substance in normal human plasma which expels granulocytic leukocytes from the bone marrow into the blood and into some of the organs. It is postulated that this substance represents the Expulsion Factor concerned with delivery of polymorphonuclear leukocytes to the circulation to replace those destroyed in the normal process of aging and disintegration.

NALBANDOV, A. V., & JAMES, M. F. (1949.) **The blood-vascular system of the chicken ovary.**—*Amer. J. Anat.* **85**. 347–367. 2898

The rapidity in growth of the fowl's ovary in the immediate pre-ovulatory period suggests a practical as well as academic interest in the vascular system of this organ. Of essentially practical importance is the occurrence of "blood clots" in hens' eggs.

The ovarian unit in the bird consists of a typical follicle connected to the ovarian stroma by a stalk. In addition to carrying the follicle the stalk bears many "parasitic" follicles, the largest of which is destined to grow to ovulatory size. The follicular sac is deciduate, the stalk non-deciduate.

The vascular system of this unit was examined macroscopically and microscopically following the injection of both vascular systems with dyes or resins and if necessary submitting the specimens to the usual histological techniques.

The numerous follicular arteries were seen to arise from the ovarian artery and from 2–4 branches lead into a single follicular stalk to ramify in the theca forming a capillary network surrounding the basement membrane. In contradistinction to this simple arterial pattern, the venous system forms at least three plexuses in close proximity to the ovum. The first is in association with the arterial capillaries, the middle outside the theca interna, the outer more peripheral. Four venous trunks arise from this latter plexus and pass down the stalk.

Microscopic studies demonstrated a similar path in smaller follicles and that the capillary net-

works nearest to the basement membrane were the last to appear. The vessels in the deciduate areas contract on release of the ovum, those in the non-deciduate area are immediately available for supply of the next follicle on the stalk. The presence of spiral arteries is recorded in the hen ovary.

In the discussion the authors suggest that the more complicated venous system may serve as a "damming up" mechanism to reduce the rate of blood-flow so as to facilitate transfer of yolk-building material, and postulate that "blood clots" in the egg must be the result of haemorrhages in the capillary layer with concomitant rupture of the granulosa and basement membrane.

—C. W. OTTAWAY.

HOWARTH, F., & COOPER, E. R. A. (1949.) **Departure of substances from the spinal theca.**—*Lancet*. 257. 937-940. 2899

It is well known that substances injected into the subarachnoid space soon appear in the bloodstream and the authors found serious evidence of the possible pathways, direct and indirect. As a result of their experiments they concluded that in the cat the venous channels are a direct route of drainage. The azygos vein was shown to carry the highest concentration of substances.

—C. W. OTTAWAY.

SJOLTE, I. P. (1950.) Om Osteomyelosklerose hos Høns. [**Osteomyelosclerosis in fowls.**]—*Nord. Vet.-Med.* 2. 309-344. [English and German summaries. Abst. from English summary.] 2900

Osteomyelosclerosis in fowls is discussed and the problem is raised whether it is a disease entity. In particular, the cause is discussed.

Besides a pronounced difference in the sex distribution, there is also a distinct relation between the occurrence of osteomyelosclerosis and the functional state of the ovary with regard to ovulation.

The incidence of the skeletal changes correlated with ovulation of the hens and appeared to indicate that it is not to be looked upon as a skeletal disease but as a physiological phenomenon by which the organism provides for a depot for the calcium to be employed in the formation of the egg-shells.

WEBER, A. F., MORGAN, B. B., & McNUTT, S. H. (1950.) **Tissue mast cells in the virgin bovine uterus during the estrous cycle.**—*Cornell Vet.* 40. 34-38. [Authors' summary and conclusions copied *verbatim*.] 2901

A study was made of the tissue mast cells of the uterus of the virgin heifer. The uteri were obtained from 33 heifers sacrificed at selected intervals throughout the estrous cycle. Mast cell

counts were made of the lamina propria and sub-laminar endometrium. These cells accumulated in large numbers in the central pitted areas of the carunculae at the onset of massive metrorrhagia, but cyclic variations in the number of mast cells were not demonstrable in other areas of the endometrium or in the myometrium or perimetrium.

TRAUTMANN, A., & FAUVET, E. (1947.) Aufbau und Funktion der Milchdrüse ohne Schwangerschaft. [**Development and function of the mammary glands without pregnancy.**]—*Dtsch. tierärztl. Wschr.* 54. 49-54. 2902

Lactation in its simplest form is a means of nourishment of the young, and even some lower groups of animals which have neither corpora lutea nor placenta are capable of producing milk.

In the presence of a corpus luteum or a placenta, the endometrium develops but the mammary gland does not, because of the presence of progesterone. In the absence of a corpus luteum, there is no physiological secretion of the uterine glands and therefore there is no physiological postponement of milk secretion and the mammae secrete too soon.

Experimentally, this unphysiological secretion can be stimulated even when a corpus luteum is present, if sufficiently large doses of follicle stimulating hormone are given.

In a series of experiments where oestradiol was implanted in castrated and in non-castrated pigs there was greater development and milk secretion in the mammae of the castrated pigs. Stimulus by milking should be sufficient to maintain the function of the gland.—M. LATZKE.

MATHER, W. B. (1950.) **Surgery of the rabbit embryo "in utero".**—*Univ. Qd. Pap. Dep. Biol.* 2. 3-6. [Author's summary copied *verbatim*.] 2903

The technique of "in utero" operations on the rabbit embryo is described with a discussion of the results obtained at various stages of gestation.

HARMER, G. L. M., & BROOM, W. A. (1950.) **Activity of some further synthetic oestrogens determined by experiments on rats.**—*Lancet*. 258. 850-851. [Authors' summary copied *verbatim*.] 2904

Large-scale experiments designed to assay the oestrogenic activity of various oestrogens have been made with ovariectomised adult female rats. The results obtained in some cases agree with clinical findings, but in others the biological and clinical results differ considerably. The significance of these discrepancies is discussed.

SAWYER, C. H., EVERETT, J. W., & MARKEE, J. E. (1949.) **A neural factor in the mechanism**

by which estrogen induces the release of luteinizing hormone in the rat.—*Endocrinology*. 44. 218–233. 2905

In rats the injection of oestrogen on the fourth day of pregnancy is followed within 48 hours by ovulation and deposition of cholesterol in the corpora lutea of pregnancy. These changes are considered to be due to a release of luteinizing hormone; they can also be produced by the injection of luteinizing hormone on the fifth day of pregnancy.

The adrenergic blocking agent, dibenamine N,N-dibenzyl- β -chloroethylamine), and the cholinergic blocking agent atropine, if injected before or up to 20 hours after oestrogen administration, each prevent the response to oestrogen, but not to luteinizing hormone.

The effect of oestrogen on the rat hypophysis is mediated, at least in part, by the nervous system
See also abst. 2971 (book, blood and plasma transfusion).

and it is suggested that oestrogen lowers the threshold to extrinsic stimulation of a gonadotrophic sex centre, probably situated in the hypothalamus.—A. G. SINGLETON.

ELIAS, H. (1949.) The liver cord concept after one hundred years.—*Science*.

110. 470–472.

2906

Observations of liver sections in man, cat, and horse suggest that the time-honoured conception of hepatic cells grouped in column or cord-like radial arrangement about the central vein is not correct and that in fact they consist of structures which will show, in almost whatever direction they are sectioned, long rows of cells one cell wide which at places may give sections appearing as large epithelial masses. The evidence is supported by stereograms and reconstructions.

—C. W. OTTAWAY.

PUBLIC HEALTH, VETERINARY SERVICES, AND VETERINARY EDUCATION

SJOLLEMA, P. (1949.) Measures to be taken by the dairy factories against infectious diseases amongst the dairy cattle [Holland]. *Proc. XIIth Internat. Dairy Congr., Stockholm*. Sect. I & VI. pp. 463–473. [In English; French summary.] 2907

The measures taken in the Netherlands to control infectious diseases of cattle are described. The Government has made the eradication of tuberculosis compulsory in certain parts of the country, but control of streptococcal infections of the udder and brucellosis have been organized by the dairy factories, as there are no official regulations relating to these conditions. In collaboration with veterinary institutions created for the purpose they make regular milk examinations to determine whether streptococci are present, and, if they are present in large numbers, the sale of the milk is prohibited. Assistance is given for the detection of affected cows, and farmers who do not co-operate in this work receive a reduced price for their milk. The eradication of brucellosis is operating only on a small scale, but regular blood tests and the inoculation of young cattle with "strain 19" vaccine have been carried out. It is hoped that co-operation over larger areas will enable the campaign to be intensified by means of important financial inducements.—J. O. L. KING.

BUCHAN, T. W. (1950.) Rheumatic fever and milk. [Correspondence.]—*Lancet*. 258. 467–468. 2908

The suggestion is made that rheumatic fever is a manifestation of allergic hypersensitivity to the streptococcus or its products, and that such sensitization may be produced in infancy from occasional

doses of streptococci in the food, e.g. cow's milk. The disease is rare in the tropics where fresh milk is boiled, and in subarctic regions where it is not widely available. Examples are given of the association of a high breast-feeding rate with low incidence of rheumatic fever. If a milk-borne allergen is an aetiological factor in the disease, the elimination of raw milk from the diet during treatment should have a favourable effect.

—W. R. BETT.

HEYWOOD, R. H. (1950.) The Australian meat export industry and long-distance transport of chilled beef.—*J. R. sanit. Inst.* 70. 145–153. 2909

A history of the meat export industry of Australia since 1847 when canned meat was first produced in N.S.W. In 1873 meat was successfully frozen in Sydney, but it was not till six years later that shipping difficulties were overcome. Since then hard frozen lamb has been continuously shipped to the United Kingdom and amounts to 15–30 % of our imports of mutton. The amount could be increased, but only if Australian farmers were to abandon wool breeds of sheep in favour of meat breeds. Hard frozen beef was at first successful, but was later superseded by the superior chilled beef from America. Attempts were made to combine chilling with chemical sterilization, as, at first, chilling alone did not check the mould growths on the long voyage from Australia; the use of chemicals was, however, prohibited by the regulations controlling the importation of meat into the United Kingdom. By 1933, the improvement in slaughter-house hygiene had considerably reduced the mould infection, and since then chilled

beef has been successfully shipped to the United Kingdom. Occasionally, however, infection had occurred and a cargo had been lost, but this risk has been eliminated by CO₂ storage. Chilled beef can be kept as long as 90 days in CO₂, but is apt to loose "bloom", and this difficulty has not yet been overcome.—R. MACGREGOR.

HINSHAW, W. R., & McNEIL, E. (1948.) **Avian salmonellosis, its economic and public health significance.**—*Off. Rep. 8th World's Poult. Congr., Copenhagen*. Vol. I. pp. 599–604. [French & Danish summaries.] 2910

Of the more than 150 *Salmonella* types 60 have been found in avian species. The types most often found in eggs and egg powder are those most often found in salmonellosis of birds. The eggs may get infected by the birds' faeces, but also in the reproductive tract, for which some types of *salmonella* have a special affinity. The multiplicity of hosts for *salmonella* sometimes makes the control of infection difficult.—A. MAYR-HARTING.

GOESLINE, H. E. (1948.) **The salmonella problem in egg and poultry products.**—*Off. Rep. 8th World's Poult. Congr., Copenhagen*. Vol. I. pp. 604–608. [French & Danish summaries.] 2911

Methods of avoiding *Salmonella* contamination of dressed poultry, eggs and egg products are discussed.—A. MAYR-HARTING.

PANJA, G., & PASRICHA, C. L. (1948.) **Organisms in healthy duck's and hen's eggs.**—*J. Indian med. Ass.* 18. 74–75. [Abstr. in *Bull. Hyg., Lond.* 24. 608. (1949), slightly modified.] 2912

Two hundred duck's eggs and 100 hen's eggs were examined for presence of bacteria in the interior. No micro-organisms of the *salmonella* group were found. *Bact. faecalis alcaligenes* was isolated in pure culture from about 10 per cent. of the eggs examined. About 70 per cent. of the eggs were found aerobically sterile.

As not all the eggs were found sterile, it is quite possible that organisms of the *salmonella* group may gain access to the eggs if the birds harbour any *salmonella* infection during the egg laying period.

PEARCE, J. A., & LAVERS, C. G. (1949.) **Liquid and frozen egg. V. Viscosity, baking quality, and other measurements on frozen egg products.**—*Canad. J. Res.* Sect. F. 27. 231–240. [Authors' abstr. copied verbatim.] 2913

Freezing irreversibly increased the viscosity of yolk and whole egg, but did not affect the white. Vigorous mechanical treatment before freezing reduced the viscosity of defrosted yolk, white, and whole egg. The viscosity of defrosted yolk and

whole egg increased with increase in freezing or thawing time. Mechanical pretreatment or differences in freezing time did not affect the baking quality of defrosted egg products. Freezing reduced the baking quality of yolk and whole egg, but the baking quality improved after storage for about three months at -10° and 0° F., and then decreased. A thawing time of four hours resulted in yolk or whole egg of better baking quality than thawing times of 0.03, 24 or 48 hr. There was no relation between viscosity and the baking quality of these egg products. The addition of 2 % sodium chloride was equivalent to the addition of 8 % sucrose in preserving the foaming quality of frozen yolk.

BOCQUET. (1949.) **Le service vétérinaire de l'armée et les problèmes de défense nationale. [The French Army Veterinary Services.]**—*Rec. Méd. vét.* 125. 723–752. 2914

B. lays emphasis on the need for an army veterinary service despite the mechanization of the army. He points out that modern scientific developments call for the adoption of numerous specialized branches of the veterinary services quite different from the traditional ones. He discusses (1) the use of animals in modern war, (2) the role of the veterinary service in the field of preventive medicine, and (3) the veterinary problems in modern warfare.

Despite the enormous achievements of the Panzer Divisions in the second world war, the German army used a large number of horses for transport, estimated at about 250,000 in the Polish campaign and 750,000 in the campaigns which followed. Mules and pack animals were an essential need in the Allied campaigns in Eritrea, Tunis, Sicily, and Italy, and had it not been for the great adaptability of the army veterinary service such great results could not have been achieved by the French Expeditionary Corps in Italy and later on by the 1st French Army.

B. draws attention to the amalgamation in 1941 of the remount service and the veterinary corps in both the French and the British armies. The horse, the mule, and the dog held their place in the recent, highly mechanized war.

The veterinary service contributes to preventive medicine and also to military and medical biological research. The great importance of the veterinary laboratories is discussed, and also the possibility of bacterial warfare and the assistance which veterinary science can give to the control of its effects. Diseases transmitted by food and water, diseases transmitted by direct and indirect contact, and those transmitted by air and by insect carriers are discussed in these respects.

B. also discusses atomic warfare and possible defence plans, pointing out that the veterinary service could play a great part.—D. S. RABAGLIATI.

RUKAVINA, J. (1948.) [30-year history of Soviet Veterinary Science following the October Revolution.]-*Jugoslav. vet. Glasn.* 2. 105-112. 2915

The economic and social structure of agriculture in the U.S.S.R. having been completely altered since 1917, veterinary science has likewise been thoroughly modernized and very largely expanded. The institution of the "Veterinary Codex" [no details] has considerably raised the status of veterinary science which now appears to be numbered among the cardinal factors in the economy of the U.S.S.R. The veterinary aims were and are the conservation and expansion of the livestock industry, a vast improvement in veterinary services, and an increase in the number of research laboratories, schools, dispensaries, and ancillary services.

There are now nine main scientific and research institutes and 37 others belonging to the several Republics constituting the U.S.S.R., and more experimental stations are planned. The number of veterinary schools has risen from four to 35, with 13,000 students taking the higher veterinary qualification; 26,004 have qualified. The number of professorial chairs in the veterinary colleges has been increased from 30 in 1917 to 335. There are 718 lecturers and over 1,000 demonstrators.—F. A. A.

BURNS, K. F. (1948.) **The history of veterinary medicine in Japan.**—*J. Amer. vet. med. Ass.* 113. 226-230. 2916

The history of Veterinary Medicine in Japan is divided according to this paper into four periods. The first "cure-by-magic" from time immemorial to Emperor Suiko's reign in 595; in the second period the Koma methods were used. In A.D. 595 during the reign of Emperor Suiko the Crown Prince controlled politics and part of his planning included the introduction of foreign methods.

During the late 17th and early 18th centuries the practice of veterinary medicine was influenced by Chinese and Dutch methods of veterinary practice. Fujiwa, who studied Dutch veterinary medicine in which emphasis was placed on dissection and anatomical terminology, subsequently published two volumes: *The new dissection of Horses*. Up to 1858 the Japanese used straw sandals to protect their horses' feet but later, due

to British influence, adopted horse shoes made from "powdered iron plus broken bracken". After this mixture was placed on the sole of the hoof, sheets of paper were placed over the mass and a hot iron applied to dry the mixture. Apparently this gave some protection.

After 1870 Dr. Etchall, an American, was engaged. He established an experimental farm for the importation and breeding of horses. English professors were later engaged and a veterinary curriculum of three years' preparatory work and two years' veterinary medicine was given. The first veterinary professor was Dr. John Adams MacBride. He founded a veterinary school at Shinjuku, Tokyo, starting in January 1878; the first students graduated in 1881. This school eventually became the Veterinary Department of the Agricultural College, Tokyo University. The curriculum included zoology, physiology, anatomy, internal treatment, surgery, "veterinary experiment" and "physical exercise". In 1874 a French veterinarian, August Ango, established a Veterinary School for Army Veterinarians with a four years' course. The curriculum included physics, chemistry, zoology, botany, anatomy, physiology, animal husbandry, pathology, surgery, medicine, cattle breeding, sanitation, and veterinary jurisprudence. For student practice a free clinic was opened for cattle, horses, and dogs. In 1875 the Army Veterinary section of the Medical Department became an independent unit and a full-time Army Veterinary General was appointed to command the veterinary service. In 1885 veterinarians were licensed for the first time. During the Russo-Japanese war epizootics appeared as a result of the military operations which involved the movement of large numbers of animals. To counteract these the Nishigahara Veterinary Research Institute was enlarged to produce bile for the immunization against cattle plague. In 1910 after the annexation of Korea, the rinderpest serum laboratory was transferred from Tokyo to Fusan in Korea, where in the next ten years research progressed toward the development of lapinized vaccine.

Progress in modern Japanese Veterinary Science has been hindered by the wars of recent years, which have absorbed the attention of the authorities.

The Allied occupation forces have improved the Japanese Veterinary Service.—J. A. GRIFFITHS.

REPRODUCTION AND REPRODUCTIVE DISORDERS

LINDAHL, P. E. (1949.) Om förutsättningarna för könsbestämning av tjursperma genom centrifugering. [The separation of male and female spermatozoa in bull semen by centrifuging.]-*S.R.B. Tidskr.* 22. 41-49.

[Abst. in *Anim. Breed. Abst.* 18. 49. (1950), copied *verbatim*. Signed: R. H. G.] 2917

This method of distinguishing sex works on the assumption that the X and Y spermatozoa differ from each other in volume by 3.3-6.0 %,

the sperm containing the X chromosome being the larger. The centrifuge is set in motion and the semen is injected through a glass tube in the axle into a separation chamber. By adjustment of the speed of rotation and the pressure of injection it is calculated that the two types of sperm can be separated, the smaller or Y sperms being carried by the force of injection out of the separation chamber, towards the middle of the centrifuge and into a collecting chamber; while the X sperms should remain in the separation chamber. Preliminary experiments on the separation of mastic particles of varying sizes proved successful. Spermatozoa, however, do not show the same uniformity of shape, and it was found, for example, that those sperms which had lost their tails ended up in the separation chamber. At the time of writing attention had chiefly been confined to testing the viability of the sperm after centrifuging. A conception rate of over 50 % was recorded. Experiments with this method are still proceeding.

MOULE, G. R. (1950.) **The influence of a rapid decrease in the hours of daylight on the sexual desire of merino rams.**—*Aust. vet. j.* 26. 84-87. 2918

Rams taken north to tropical Australia in winter and spring often do not serve satisfactorily until the following autumn. It has been suggested that decreasing hours of daylight may be an important factor in stimulating libido in rams.

Four rams were penned in a dark room at an earlier hour each day from 10/2/49 to 22/10/49, effective daylight being reduced by 3.75 hours in six weeks. A control group of four rams was run out of doors during this period. All rams were fed a ration known to be satisfactory for semen production. All but one of the rams had been introduced in preceding winters, two rams in the treated group having been introduced the previous June.

When placed with ewes in season on two occasions at the end of treatment, all the treated rams completed service, though one of the two above mentioned was not completely satisfactory. None of the control rams completed service. This agrees with results obtained in a trial the previous autumn.

It may be worth while to subject rams to dark-room treatment for summer mating and to introduce southern rams about the autumn equinox.

—A. A. DUNLOP.

SELÇUK, H. (1949.) **A rapid test for pregnancy diagnosis.**—*T. C. Askeri. vet. Derg.* 25. 219-223. [In English.] 2919

S. described a rapid test based on the hyper-

aemic response of the ovaries of immature mice to injected pregnancy urine. When the test was used on 117 samples of urine from women patients only one of the 48 negative readings was found to be incorrect, and this was from a patient affected with icterus which was therefore concluded to have vitiated the test. Of the 69 positive urines three were associated with ectopic pregnancies and the rest with normal pregnancies. Details of the technique are given.—B. A. CROSS.

ALLEN, C. E., & DOW, D. S. (1949.) **Equine pregnancy diagnosis by biological and chemical techniques.**—*Sci. Agric.* 29. 302-304. 2920

Ninety-six urine samples and 47 serum samples from 119 mares were subjected to pregnancy tests. The sera were examined by the biological test of Cole and Hart using immature rats. The urine samples were tested chemically by the method of Cuboni modified by Cole and Hart.

Results were compared with foaling records and the two tests gave 8.5 % and 7.3 % error respectively. The biological method gave four, and the chemical method seven incorrect negatives. In all these seven cases the samples were collected within the period of pregnancy when correct positives were obtained. There were no incorrect positives.—E. J. H. FORD.

MESCHAKS, P. (1948.) **Orientating investigations of neutral steroids in urine of cattle and horse.**—*Skand. Vet. Tidskr.* 38. 278-298. [In English.] 2921

M. described in detail a method for the chemical assay of neutral ketosteroids (male hormone) in samples of urine and blood from horses, cattle, sheep, pigs, and dogs. After extraction the steroid was estimated photometrically following treatment with (a) Pincus' antimony trichloride reagent, or (b) Zimmermann's *m*-dinitrobenzene reagent. With (a) blood extracts from horses and cattle and urine extracts from human beings, pregnant mares and newborn foals gave a blue colour, whereas urine extracts from horses and cattle gave a violet colour. In the samples of animal urine the substances which produced colour with antimony trichloride were found to be associated with the non-ketonic fraction while those from human urine were associated with the ketonic fraction, *i.e.* androsterone or its isomers. With (b) a red-violet colour representing 17 ketosteroids was given by all extracts.

Steroid occurrence in animal urines varied with specific gravity, time of day, and state of health of the subject. Mean values (138 animals)

were as follows: bulls 22 mg. per l., cows 16 mg., mares 17 mg. and stallions 19 mg. No significant alterations were found in different stages of the

See also *absts.* 2823 (haemolytic jaundice); 2824 (Rh factor); 2884-5 (sex hormones); 2904-5 (synthetic oestrogens); 2925 (buffaloes); 2938 (staining of spermatozoa).

sex cycle or pregnancy but the urine of cows with adrenal virilism had a mean value of 20 mg. per l.

—B. A. CROSS.

ZOOTECHNY

LAMIRE. (1949.) La race hollandaise au Maroc. [The Holland cattle breed (? Friesian) in French Morocco.]—*Rev. Élev. Méd. vét. Pays trop.* 3. 51-52. 2922

In 1948, 19 bulls and 604 cows of Holland breed were imported. These have only thriven in places where the stabling and pasture is good and tick infestation is at a minimum. When these conditions have not been observed, the animals have not thriven and milk yield has gone down. That this is not due to climate is shown by the fact that many of the well run, successful dairies were in hotter and damper places than the unsuccessful, badly run establishments. Cross-breeding is not successful, as the cross-bred progeny either lose their high milk yielding characteristic or tolerance to tick-borne diseases, or both. Regulations now prohibit the importation of Holland cattle except for the owners of "tick proof" stables with ample food supplies. The number of these is limited, but is being increased.

—R. MACGREGOR.

BARADAT, R. (1949.) Notes sur l'exploitation du cheptel cambodgien. [Cattle husbandry in Cambodia.]—*Rev. Élev. Méd. vét. Pays trop.* 3. 29-37. 2923

Owing to religious prejudice against taking animal life and the reputation of wealth that large herds give, the pastures of Cambodia are overcrowded. The soil has been badly denuded and the animals lose condition in the dry season and cannot replace it in the rainy season. Cows have 65-88 % fertility and buffaloes 43-61 %, but in both species the calf mortality is about 25 %. Parasitism is heavy and rinderpest is endemic. There is some attempt to cope with the latter by vaccines, but the service is badly organized and the owners call on it only when their animals are already infected. B. believes that success can only be achieved when the service is able to vaccinate cattle before outbreaks occur.—R. MACGREGOR.

BESNAULT. (1949.) L'élevage dans les établissements français de l'Océanie. [Animal husbandry in the French possessions in the Islands of the Pacific Ocean.]—*Rev. Élev. Méd. vét. Pays trop.* 3. 5-11. 2924

Prior to the influx of Europeans to these islands, the rat, dog, and pig were the only mammals there. The term "Local breeds of domestic animals" therefore means heterogeneous mixtures

of imported strains. The climate differs considerably through the length of the archipelago, but as a whole is humid. There is ample shade and conditions are more favourable for oxen and pigs than for sheep. The largest animal population is on Tahiti which has 5,000 cattle, 6,000 pigs, and 800 horses. These live on the natural herbage of the coconut plantations which are the islands' chief industry. In doing so, they keep the "cover crop" short, manure the soil, and facilitate the harvesting of the nuts. The hills are covered chiefly with wild hibiscus, but some have been completely denuded by bad cultivation. The cattle consist of mixed European strains with about 10 % zebu blood, but this last is unpopular as it is believed to make a wild undisciplined animal. Pigs are numerous and are mostly eaten by their owners, but Papeek town consumes 18 tons of pork a month. Sheep have not been successful owing to parasitism and killing by stray dogs. Of the other islands, only Rapa and Tubuai have a surplus animal population which is exported. The Marquesas sell some cattle to passing ships. They have a large goat population which, however, is now being exterminated because of the damage these animals do to cultivation.—R. MACGREGOR.

HAYWARD, A., VINATIERI, E., & CHAWLA, L. R. (1949.) Notes on the system of management of buffalo herds in the military farms department in India.—*J. R. Army vet. Cps.* 20. 155-159. 2925

In India the majority of dairy produce consumed by the army is supplied by the Military Farms Department, by which the farms are controlled. There are three main breeds of buffaloes in these farms which supply the army in Northern India. The milk yield of the buffalo cows averages between 3,000 and 3,500 lb. of milk per 300 days.

The majority of the buffaloes are purchased newly calved and in-milk at about eight years of age; they are usually stall-fed as the grazing is often very poor. Concentrates are fed in the form of a balanced ration of grain and oilcake, one part of each being the most satisfactory proportion. The basic ration is from 1 to 5 lb. per day, depending on the amount of green fodder available. To this, a production ration of 1 lb. of the mixture is added for every 3 lb. of milk produced.

Buffalo milk is very rich in fat, varying from 6.4 % when newly calved to 8 % after 211-220

days. Sick animals are evacuated to sick lines in order to facilitate observation and treatment.

A well-known but most undesirable practice in India is "Phooka", in which stimulation of the milk flow is produced by the insertion of a foreign body (e.g. the tail) into the vagina. This apparently causes the required neural or endocrine stimulus of the posterior pituitary and release of the hormone responsible for letting down the milk. This is thought to be oxytocin.

Oestrus is not so noticeable in the buffalo as in the cow and the gestation period is from 306 to 317 days.

Artificial insemination appears to be used in some cases, but in hot weather there is much

infertility. The main breeding season is from October to January.—D. S. RABAGLIATI.

EATON, O., & CABELL, C. A. (1949.) **Raising laboratory mice and rats.**—U.S. Dept. Agric. Leaflet No. 253. pp. 1-10. 2928

Notes are given upon the reproduction, growth, feeding, housing, diseases, sale, and transport of laboratory mice and rats. A diagrammatic representation of the numbering system in use in the genetics office of the Bureau of Animal Industry is provided: this is a combination of toe-clipping and ear-punching and permits of individual identification up to 12,999.

—ALASTAIR N. WORDEN.

TECHNIQUE AND APPARATUS

JÄRVI, O., & LEVANTO, A. (1950.) **On the structure of bacterial cells, as seen by the use of histochemical polysaccharide tests.**—*Acta path. microbiol. scand.* 27. 473-486. [In English, authors' summary copied *verbatim*.] 2927

A method was used for detecting polysaccharides, in which treatment with chromic acid or periodic acid was followed by the demonstration of the aldehydes so formed with ammoniacal silver nitrate solution. Septa were found in both cocci and rod-shaped bacteria which evidently had some connection with cell division. In some rod-shaped bacteria, and particularly in *Corynebacterium diphtheriae*, divisions could occur in planes longitudinal as well as transverse. In all species examined there were found to develop, as a result of successive incomplete separations of daughter-cells, rods or the more complex bacterial aggregations that are usually known as "involution forms". Thus it is suggested that there is an analogy between these divisions of bacteria and Heidenhain's "polymerisation theory" of the division of some higher cells. It follows from this that the variation in size of many bacterial individuals and the differing length of rods or segments of rods may be due to an "internal division" without any accompanying morphological changes in the cell.

Any final proof of these suggestions must first entail a detailed investigation with quantitative measurements, and a more thorough comparison of the nuclear constitutions of certain species than has been possible in this preliminary survey.

SPANEDDA, A. (1949.) **Sviluppo del Mycobatterio TBC umano in terreno di Dubos con glicerina o con tuorlo d'uovo. [Growth of *Mycobacterium tuberculosis* in Dubos medium with glycerin and with egg-yolk.]**—*G. Batt. Immun.* 41. 321-325. [English, French, and German

summaries. Abst. from English summary.] 2928

The addition to Dubos' medium of 0.5 % of glycerol slightly inhibits growth and produces constantly rough colonies of human type *Mycobact. tuberculosis*. Small quantities of egg yolk alkaline solution (Besredka) in this medium favours growth.

HAMILTON, F. J. (1950.) **A technique for the collection of nematodes from the alimentary tract of sheep.**—*Aust. J. agric. Res.* 1. 93-98. 2929

The need for relatively large amounts of worm material for biochemical and immunological studies is met by the technique described. The worms are drawn off and collected by interposing a series of sieves between a pipette, which picks the worms from a suspension in normal saline, and a water suction pump. When small nematodes like *Trichostrongylus* spp. are being collected a specially constructed "separation" beaker is used to eliminate debris.—H. McL. GORDON.

PUSCH, J., SENNE, I., & BEYER, W. (1950.) **Ein verbessertes, einfaches Verfahren zum Nachweis von Parasiteneiern in Kotproben. [A simple method of testing faeces for worm eggs.]**—*Tierärztl. Umsch.* 5. 54-55. 2930

For the rapid detection of worm eggs in faeces the authors recommend the addition of three drops of 2 % aqueous solution of eosin for faeces which have been sedimented and placed in a petri dish. The eggs, when examined under the microscope in daylight, have a green fluorescence whilst plant material and the background stain red.—M. L. CLARKE.

I. MUDD, S., & SMITH, A. G. (1950.) **Electron and light microscopic studies of bacterial nuclei. I. Adaptation of cytological processing to electron microscopy; bacterial**

nuclei as vesicular structures.—*J. Bact.* 59. 561–573. [Authors' discussion and conclusions copied *verbatim*.] 2931

II. SMITH, A. G. (1950.) **Electron and light microscopic studies of bacterial nuclei. II. An improved staining technique for the nuclear chromatin of bacterial cells.**—*Ibid.* 575–587. [Abst. from author's summary.] 2932

I. The preparative procedure described permits parallel electron and light cytological observations to be made to complement one another in learning the effects of successive steps of cytological processing and in analyzing the nature of the structures under observation. Osmic acid vapor is thus shown to be an excellent fixative in that it preserves the pre-existing pattern of nuclear sites and enveloping cytoplasm, and accentuates contrast both in the electron and light microscopic pictures. Treatment with hydrochloric acid completely reverses, in the electron microscope image, the pattern of density contrast between nuclear sites and cytoplasm. The hydrochloric acid treatment removes the cytoplasmic basophilia, permitting clear visualizing in the light microscope of the stained nuclear chromatin.

The unfixed nuclei of young actively growing *Escherichia coli* cells have previously been shown to have less density than the enveloping cytoplasm (Hillier, Mudd, and Smith, 1949). The contrast in density between nuclear sites and cytoplasm is accentuated both in electron and in light pictures by fixation with OsO_4 vapors. These facts strongly suggest that the bacterial nuclei have a lower density (mass per volume) of solid matter to affect electrons and photons and to fix osmium than the surrounding cytoplasm. The nuclei also have characteristic shapes and do not merge with the cytoplasm. In the nuclear sites after appropriate processing Feulgen-positive bodies are found that stain with chromatin dyes and behave characteristically toward nucleic-acid-splitting enzymes. Expressed in the idiom of the cytologist, bacteria possess vesicular nuclei containing chromatin.

II. A simplified cytological technique for demonstrating the chromatinic bodies within bacterial cells is presented and has been found to be generally applicable.

The technique, modified from the procedures of Robinow and DeLamater, consists of fixation in osmium tetroxide vapor, treatment in hydrochloric acid, mordanting in dilute formaldehyde, and staining in aqueous basic fuchsin, and is considered to possess advantages in terms of selectiveness, keeping qualities, and rapidity of preparation.

BRECHER, G. (1949.) **Phase microscopy in the study of reticulocytes.**—*Bull. Intern. Assoc.*

Med. Museums. 30. 99–105. [Author's summary in *Stain Tech.* 25. 117. (1950), copied *verbatim*.] 2933

Intracellular granules can be identified with phase illumination in unstained rabbit reticulocytes. During reticulocytosis induced in rabbits by phenylhydrazin administration, aggregation of the intracellular granules can be seen in unstained preparations with phase illumination. Examination of stained preparations of rabbit blood after phenylhydrazin administration indicates that the stained reticulum and the granules seen with the phase microscope are closely related but not identical structures.

KEMPSON, D. A. (1950.) **Low-power phase-contrast microscopy without a condenser.**—*Quart. J. micr. Sci.* 91. 109–110. [Author's summary copied *verbatim*.] 2934

With those low-power objectives in which a phase-plate can be placed near the back focal plane, phase-contrast microscopy can be obtained without the use of any condenser. The illuminating annulus is placed in the conjugate focus of the phase-plate.

LOVELAND, R. P. (1949.) **Color photomicrography in the laboratory.**—*Anal. Chem.* 21. 467–475. [Abst. in *Stain Tech.* 25. 116. (1950), copied *verbatim*. Signed: R. T. WHITTENBERGER.] 2935

Use of a roll-film camera and flash bulbs makes darkroom and processing facilities unnecessary. It is advantageous to have an image plane that is open for inspection and analysis, and in which the film is placed directly. Methods for the quantitative and qualitative analysis of illumination are described and criteria of optimum exposure are given.

BARTHOLOMEW, J. W., & MITTWER, T. (1950.) **The mechanism of the Gram reaction. I. The specificity of the primary dye.**—*Stain Tech.* 25. 103–110. [Authors' abst. copied *verbatim*.] 2936

Dyes of all major types were tested for their suitability as the primary dye in the Gram stain. When a counterstain was not used, some dyes of all types were found to differentiate Gram-positive from Gram-negative organisms. When a counterstain was used, these dyes were found to vary greatly in their suitability. Those dyes found to be good substitutes for crystal violet were: Brilliant green, malachite green, basic fuchsin, ethyl violet, Hoffman's violet, methyl violet B, and Victoria blue R. All are basic triphenylmethane dyes. Acid dyes were generally not suitable. Differences in the reaction of Gram-positive and Gram-negative cells to Gram staining without the use of iodine

were observed and discussed but a practical differentiation could not be achieved in this manner. Certain broad aspects of the chemical mechanism of dyes in the gram stain are discussed.

PEARSE, A. G. E. (1950.) **Differential stain for the human and animal anterior hypophysis.**—*Stain Tech.* 25. 95–102. [Author's abst. copied *verbatim*.] 2937

A staining method is described for human and animal pituitary glands which is based on a combination of a modification of the phosphomolybdic acid, orange G stain of Berblinger and Burgdorf's (1935) method, with an iron hematoxylin stain for the nuclei and with the periodic acid-Schiff routine of Hotchkiss and McManus. The cytochemical part of the procedure demonstrates both muco-protein precursors of the gonadotropins and, it is thought, these hormones themselves. By comparison with other methods, finer differences in the cytology of the cyanophils can be appreciated. Quantitative cell counts are readily performed and large numbers of cells, appearing by Mallory and other histological methods to be chromophobes, are found to belong to the cyanophil series. Counts done by older methods, therefore, are considered to be inaccurate and misleading.

BLOM, E. (1950.) En hurtig-farvningsmetode til adskillelse af levende og døde spermier ved hjælp af eosin-nigrosin. [**Rapid eosin-nigrosin staining technique for differentiating living from dead spermatozoa.**]—*Nord. Vet.-Med.* 2. 58–61. [English and German summaries. Abst. from English summary.] 2938

On a slide, a small drop of semen is mixed with a drop of 5 % eosin in distilled water, about twice the size of the drop of semen. After mixing for some seconds, a drop of 10 % nigrosin solution in distilled water (twice as big as the drop of eosin) is added to the mixture and the mixing is repeated. A thin smear of the mixture is made on a slide, dried over a flame and examined.

Spermatozoa that were dead are stained red and those that were alive are unstained.

POPHAM, R. E. (1950.) **Cedarwood oil as a clearing agent with acetic-alcohol fixatives.**—*Stain Tech.* 25. 112–113. 2939

When cedarwood oil is used as a clearing agent after fixation of the tissue with acetic acid and alcohol, precipitation of some tissue substance may occur. This can be prevented by dissolving 1.2 % of xylene in the cedarwood oil prior to use.

—E. EDEN.

DELEZ, A. L., & DAVIS, O. S. (1950.) **The use of oxalic acid in staining with phloxine and hematoxylin.**—*Stain Tech.* 25. 111–112. 2940

The use of either oxalic or acetic acid had an

enhancing effect on staining with phloxine, orange G, eosine Y, and other similar counterstains. Oxalic acid with phloxine and haematoxylin proved to be most satisfactory for routine use.—E. EDEN.

GROAT, R. A. (1950.) **Preparation of copolymers of isobutyl methacrylate and styrene for mounting media.**—*Stain Tech.* 25. 87–94. [Author's abst. copied *verbatim*.] 2941

Details are given for the preparation of low molecular weight copolymers of isobutyl methacrylate and styrene for use in mounting microscopical sections between the slide and cover glass. Any refractive index in the range from 1.477 to 1.590 is available, depending upon the proportions of monomers used. A refractive index of 1.550 is recommended for general purposes, though other indices might be desirable in special cases including phase microscopy. The resin gives solutions in toluene of suitable fluidity at usable concentrations, adheres satisfactorily to glass, and has excellent light-transmission. The features which make it especially valuable are its optimum refractive index and its permanent water-whiteness.

Copolymers of isobutyl methacrylate and styrene may also be used to prepare plastic mounts of thick sections or gross specimens, which are optically cleared by the plastic mountant.

HAYES, E. R., & HAYES, N. P. (1950.) **An improved embedding box for paraffin.**—*Stain Tech.* 25. 113. 2942

Light-weight aluminium foil is advocated for making containers for paraffin blocks. It is easily malleable and satisfactory when embedding in "carbawax" but should not be used for celloidin, as the vapours do not penetrate the foil to produce hardening.—E. EDEN.

SCALES, J. T. (1950.) **Use of polyester resins in medicine.**—*Lancet.* 258. 796–798. 2943

A brief description is given of the chemistry of this type of plastic material. Details are also presented of its uses for casting and embedding of museum specimens and for the production of orthopaedic appliances.—E. EDEN.

MAURER, F. D. (1949.) **A head holder for laboratory animals.**—*Bull. U. S. Army med. Dep.* 9. 348–350. 2944

An illustrated description is given of a holder designed to facilitate the aseptic P.M. removal of brains from g. pigs. The instrument was designed for use with animals of from 300 to 500 g. body weight, but it is claimed that proportionate alterations in the size of the head rest would make it readily applicable to other species of laboratory animals.

The holder comprises a stainless steel head rest or platform, depressed so that it conforms

with the shape of the mandibles, mounted on a heavy iron base. The weight is slightly over 5 lb. The holder is placed on a sheet of heavy paper in a stainless steel tray large enough to accommodate it and the animal. The operator faces the animal and, after removal and division of the skin of the dorsum and sides of the head, clamps the resulting quadrants firmly to the top of the platform and proceeds to aseptic removal of the brain by conventional methods.—ALASTAIR N. WORDEN.

COBURN, W. H. (1949.) **Aerosol as an aid to bone decalcification.**—*Bull. Intern. Assoc. Med. Museums.* 29. 93. [Abst. in *Stain Tech.* 25. 116. (1950), copied *verbatim*. Signed H. J. Conn.] 2945

The author has tried the use of wetting agents to cut down the time necessary to decalcify bone specimens and found best results with aerosol (dioctyl sodium sulfosuccinate). Specimens fixed

See also absts. 2864-5 (jet injection); 2871 (implantation of penicillin tablets); 2919-20 (pregnancy diagnosis).

in Zenker's fluid and washed 4-6 hours are placed in the following solution: HNO_3 (conc. ?), 5 ml.; 10 % aqueous aerosol, 1 ml.; water (distilled ?), 100 ml. (The HNO_3 solution can be kept on hand, but the aerosol must be added to it just before use.) Decalcification required 4 hr. or less for small specimens, but the larger pieces need overnight treatment. Formalin-fixed tissues may be treated similarly, but results are less satisfactory.

HORROCKS, R. H., & MANNING, G. B. (1949.) **Partition chromatography on paper. Identification of reducing substances in urine.**—*Lancet.* 256. 1042-1045. 2946

Partition chromatography was found to be a useful tool for differentiating the various reducing substances present in urine. Details for the separation of disaccharides, hexoses, pentoses, ascorbic acid, homogentisic acid and salicylates are given.

—E. EDEN.

MISCELLANEOUS

WILKINS, J. H. (1949.) **Atomic warfare and animals.**—*J. R. Army vet. Cps.* 20. 63-66; & 104-106. 2947

When an atomic bomb explodes four major effects are produced. These are flash, blast, fission products, and radiations. The flash is instantaneous and causes a very high rise in temperature with outbreaks of fire within a radius of six miles. The blast pressure will kill all animals within a radius of 1,000 ft., but injuries are usually due to animals being blown against buildings, etc., or being struck by flying debris. The fission products are radio-active dusts which are usually dispersed in the stratosphere but may settle many miles away causing a mild dermatitis and whitening of the hair. The radiations are the chief hazard and give rise to radiation sickness. The chief symptoms are nausea and vomiting, diarrhoea, fever, prostration, urination, lachrymation, dropping off of hair, ulceration of mucous membranes, anaemia, leucopenia, and death. Nausea and vomiting usually occur on the day of the explosion, but the other symptoms may be delayed for several weeks and death may not occur for three months. There may be chronic effects such as infertility, tissue proliferations, or necrosis.

Treatment aims at overcoming shock, restoring blood volume, and preventing infection. Protamine, toluidine blue, and rutin have been used successfully in animals to treat the multiple haemorrhages and petechiae. Protection is afforded by any material, its value being roughly proportional to its specific gravity. Affected animals should be sponged with water, citric acid or tannic

acid and potassium permanganate crystals rubbed into folds of skin or sensitive parts. Clothing may be repeatedly washed in citric acid and impermeable surfaces washed with soap and water. All food material must be destroyed and grazing prohibited in an affected area. All wood and paint must be destroyed. Contaminated road surfaces may be rendered comparatively safe by covering them with a 1-2 in. layer of gravel.

—J. A. NICHOLSON.

PULLAR, E. M. (1950.) **The wild (feral) pigs of Australia and their role in the spread of infectious diseases.**—*Aust. vet. J.* 26. 99-110. [Author's summary slightly modified.] 2948

The wild pigs of Australia are the descendants of escaped domestic stock, and should therefore be termed "feral" pigs. Their appearance varies considerably, but in general they are small, narrow bodied and rough with big heads and shoulders and small hind-quarters. A large proportion of the pigs are black, although other colours are seen.

A large part of Queensland and Northern New South Wales is infested with pigs. Isolated colonies are also present in Queensland, New South Wales and Western Australia, and on a number of coastal islands, including Kangaroo and Flinders Islands.

Feral pigs have been responsible for the spread of anthrax and possibly tuberculosis, and could assist the dissemination of exotic diseases. They do considerable damage to crops, fencing, water works and drains, stacked fodder and indigenous fauna, and also kill large numbers of lambs.

Feral pigs have some economic value in that they provide a useful alternative source of meat in sheep and cattle country, and are used as a source of store stock by some farmers. They are also important scavengers of carrion.

Habits, diet, habitat, movement and contact with other animals is described to provide data for control programmes. Control by hunting, poisoning, bonuses for killing and natural enemies is described and discussed.

REPORTS

GREAT BRITAIN. (Undated.) **The Edinburgh and East of Scotland College of Agriculture. Report on the work of the College for the year ending 30th September, 1947.** pp. 100. Items of veterinary interest, pp. 62-68. Edinburgh: The College. 2949

The development of the Veterinary Investigation Officers' service has progressed satisfactorily. The work at Hill Research Committee Farm at Sourhope has been curtailed owing to the impossibility of obtaining a veterinary assistant until housing accommodation can be provided. The routine diagnosis service has been well maintained and gives useful service to veterinary practitioners on the following diseases. In cattle, contagious abortion, mastitis, Johne's disease, actinobacillosis, trichomonas abortion, acetonaemia, and lead poisoning. In sheep—enterotoxaemia, parasitic gastro-enteritis, orf, pine, arthritis in lambs, pregnancy toxaemia, lamb dysentery, louping ill, abortion, tick-borne fever, and coccidiosis in poultry.

One severe outbreak of abortion in ewes was investigated. Bacteriological examinations gave negative results. Inoculation of 20 pregnant ewes was carried out with material from ewes that had aborted, and seven of the inoculated ewes aborted one week before the date due. Ten pregnant ewes were left as controls and apparently there were no abortions among these. Owing to severe winter and spring conditions no research work was possible on Hill sheep abortion. Great losses were sustained by Hill farmers from the blizzard.

Experimental work on *Str. agalactiae* MASTITIS confirmed that mass penicillin therapy can eradicate the disease and that animals on the farms cleared remain free from infection.

Ten thousand lambs were used to test ORF vaccine, but the lambs inoculated developed no more resistance than the uninoculated control lambs. Further research is in progress to ascertain the unity, if any, of the various strains of "orf" in the area.

Dippings for control of ticks and blowfly were carried out with the D.D.T. dips M.37 and M.43. No engorgement of ticks was observed on D.D.T.-dipped sheep up to 30 days after dipping when the experiment observations ceased. D.D.T. dip appeared to be more efficient than arsenic dip on clean sheep, but it was not possible to determine

its efficiency in scouring sheep. Most of the BLOWFLY STRIKES occurred on dirty sheep.

A survey of sheep disease at Sourhope revealed that ticks were more plentiful, but no blood parasites were found. There were very heavy HELMINTH INFESTATIONS among the hogs. After treatment with phenothiazine there was a very definite improvement among both hogs and ewes treated. The lambing season of 1947 was bad owing to debilitated ewes, cold, wet weather at lambing time, scarcity of young grass, lambs therefore born weak and ewes with no milk.

Other lamb diseases confirmed at Sourhope were PYAEMIA, JOINT ILL, DYSENTERY, PULPY KIDNEY DISEASE, ENTEROTOXAEMIA, and one fatal case of SCRAPIE in an ewe. ORF occurred among adult sheep and among lambs. COBALT DEFICIENCY PINE was noted among blackface sheep in one area.

Laboratory work included 153 P.M. examinations. Among these were 35 cattle and 89 sheep. There were 885 milk tests and of these 3.6 % were positive for TB. In a study on biting midges in Scotland, tentative observations on cattle and horses on farm pastures showed that they were attacked by *Culicoides obsoletus*, *C. impunctatus*, *C. pulicaris*, and *C. nubeculosus*, and also by *Simulium ornatum*, *S. reptans*, and *S. monticola*. In an experiment to control the soil-inhabiting larvae of midges the use of an emulsion of D.D.T. on one plot and an emulsion of gammexane on a second plot gave an appreciable measure of control.—J. A. GRIFFITHS.

GREAT BRITAIN. (1947.) **Report of the Hannah Dairy Research Institute for the four years ending 31st March, 1947.** pp. 36. Kirkhill, Ayr: The Hannah Dairy Research Institute. Items of veterinary interest, pp. 16-25. 2950

An extensive study of the incidence of STREPTOCOCCAL MASTITIS has been made, using the Hotis test. An analysis of results of periodic tests of nearly 6,000 cows revealed that there is a loss of 8 % in the milk output. It was found there was a considerable proportion of animals which were persistent skin-carriers of the causal organism. A disinfecting technique could be adopted at milking time. It was found that the organisms can survive in dried-milk smears for at least three years. An outbreak of UDDER TB. in an attested herd was found to be associated with udder

irrigation, but the source of the infection was obscure.

Earlier investigations on DISEASES OF CALVES had shown that in Ayrshire they may in some years cause losses amounting to 30 %. Most of the losses result from "WHITE SCOUR". During the past two years the Institute has co-operated with Moredun Institute to investigate the hypothesis that VITAMIN DEFICIENCY IN THE DAM following indoor winter feeding increased the incidence of calf losses in the spring. Vitamin C showed no seasonal variation in the estimates made by P.M. determinations from abattoir specimens of the dam. Vitamin A and carotene contents gave unexplained variations throughout the year. The causes of this are still being investigated.

The importance of inadequate storage conditions for the conservation of feeding stuffs produced in summer for winter use has led to investigations by the Institute on the prevention of moulding during storage. This is the most important cause of deterioration—apart from insect infestation—and is associated with high humidity or high moisture content. It was found that in dried grass relative humidity should not exceed 67 %, the equivalent of 13 % moisture in the dried grass itself. The same technique applied to other feeding stuffs showed that in general the same conditions applied. Exact recommendations were given in Reprint 145 published by the Institute. These were that for a short period (three months) relative humidity should be 72 %; for periods up to 2–3 years a figure as low as 65 % must be regarded as the safe minimum. The primary controlling factor in mould growth is humidity rather than moisture content. Reprint No. 146 gives detailed figures of humidity relationships of all major animal foodstuffs from which safe moisture content could be calculated. Reprint No. 147 is a popular summary of the whole investigation. Investigation of suitable preservative agents to prevent mould growth showed that borax failed even in high concentrations. In feeding tests no adverse effects were observed, but it was thought that a high concentration of boron in the manure might well in time raise the boron content of the soil to a toxic level. Propamidine and sulphonamide (E.O.S.) were found to inhibit the growth of moulds on the surface of linseed cake.

Synthetic nitrogen compounds which can be readily manufactured from atmospheric nitrogen provide protein which can be utilized by ruminants, as has been shown by the Institute and also numerous workers overseas. The efficiency of utilization is about 75 % of that of a first-class protein. In experiments to determine how the ruminant makes use of one of these simple compounds, *i.e.*, urea, it was shown that this was

achieved by the conversion of the ingested urea into ammonia and the subsequent use of this compound by the micro-organisms of the rumen to build up their own cellular protein. It has now been possible not only to correlate the synthesis of protein with that of a starch-like polysaccharide and with the simultaneous multiplication of certain rumen bacteria, but to isolate the protein-rich material and to determine its composition. Microscopically it was found to consist chiefly of bacteria and bacterial debris. It resembles a protein concentrate such as linseed cake; it contains 36 % protein, 10 % fat, and about 47 % carbohydrate. Tests with rats show that it has a high biological value. These results obtained by *in vitro* methods were checked with those taking place in the rumen itself and they were found to be essentially identical, *i.e.*, carbon dioxide, methane, and organic acids. It is thought that the use of these synthetic proteins, developed as a war-time measure, will find a valuable use as a supplement to low-protein rations. It is suggested that imported protein concentrates should be used for non-ruminants such as the pig, which cannot utilize synthetic protein.

The feeding of iodinated proteins such as casein and ardein is capable of stimulating milk secretion in mid-lactation by as much as 20 %. The fat content as well as the yield is normally raised.

Among other experiments, mention is made of the excretion of copper ingested from copper sulphate sprayed herbage. The excretion from the animal was found to be rapid and the slight extra amount in milk is transient.

The use of stilboestrol to induce lactation in freemartins was not a success and there was no normal development of the genital organs as a result of using this preparation.—J. A. GRIFFITHS.

NORTHERN IRELAND. (1949.) Agricultural Research Institute of Northern Ireland, Hillsborough, Co. Down. Twenty-second Annual Report, 1948–49. [ANON.] pp. 40. Hillsborough, Co. Down. The Institute. [Items of veterinary interest, pp. 20–23.] 2951

The system of poultry breeding now adopted ensures that no bird is used for breeding purposes until it is approaching two years of age. Young stock are incubated and reared in isolation from old stock. This scheme appears to have improved the health of young stock; 1.1 % died before they were eight weeks old, and a further 3.1 % failed to survive to the age of five months. No deaths were due to COCCIDIOSIS, WORMS, or FOWL PARALYSIS. Weight and egg production appeared to be favoured by the management, but a further 9.3 % of the pullets died during the first year of their lives, PERITONITIS being the chief cause of

death. One case of FOWL PARALYSIS occurred in a pullet at about 15 months, and this, together with two cases of LEUCAEMIA, two cases of TUMOURS, and five cases of IMPACTION OF THE CROP all occurred in three full sister families from a full sister sire.—G. B. S. HEATH.

AUSTRALIA. (1948.) **Twenty-second Annual Report of the Council for Scientific and Industrial Research, for the year ended 30th June, 1948.** pp. 141. Canberra: L. F. Johnson, Govt. Printer. 8s. 2952

Intensive penicillin treatment of MASTITIS IN DAIRY CATTLE failed to eliminate *Streptococcus agalactiae* from two herds under observation, and the degree of infection returned to pre-treatment levels in 6–12 months after treatment ceased. STAPHYLOCOCCAL MASTITIS did not respond even to large doses of penicillin. "Sulphone" was not effective. Combined treatment with both drugs was better but still unsatisfactory.

Animals vaccinated once against BOVINE CONTAGIOUS PLEURO-PNEUMONIA had a high degree of resistance after three years and there was no difference between groups vaccinated once and those vaccinated twice, whether on the high or the low plane of nutrition. Both local and serological responses became less at each yearly vaccination.

The organisms concerned in bacterial oxidation of arsenical cattle-dipping fluid are best classified as belonging to the genus *Pseudomonas*. The mode of action and effects of preventive compounds added to the dipping fluid are discussed.

The effects of various formulations of D.D.T. and benzene hexachloride against the cattle tick, *Boophilus microplus*, were studied. Benzene hexachloride has not so great a residual toxicity as D.D.T. Both compounds sediment in dipping vats and require special dipping techniques to ensure adequate re-suspension. Bio-assay tests were developed for ticks and in these tests "chlor-dane" and "toxaphene" had outstanding toxic effects. Tests were begun to determine whether arsenic resistance of ticks may be related to a high intake of fluorine by cattle. Biological and ecological studies on *B. microplus* were in progress.

Studies on internal parasites of cattle at the newly established Veterinary Parasitology Laboratory at Yeerongpilly, Queensland, included work on the life-cycle of *Onchocerca* spp., and on the epidemiology of PARASITIC "GASTRO-ENTERITIS" OF CALVES. Outbreaks occur mainly in young stock in late winter and early spring when pastures are poor. Seasonal changes in infestation were being followed in groups of calves at a number of centres. Infestations reach a peak during the first 4–6

months of exposure and then decline. Adult cattle are relatively resistant.

Studies on the bionomics of the foot louse (*Linognathus pedalis*) showed that lambs could become infested from pasture plots from which infested sheep had been removed 48 hours previously. Arsenic, rotenone, D.D.T., and benzene hexachloride were all toxic to nymphs and adults, but only benzene hexachloride possessed effective residual toxicity. None killed the eggs. "Stripping" of D.D.T. from suspensions in dipping fluids was less marked from plunge dips of large dimensions than from shower or spray dips. The rate of "stripping" varied with different formulations. Control of Body Strike by SHEEP BLOWFLY was effected by spraying or dipping with benzene hexachloride, the effects of which persisted for five weeks. In a small trial of jetting to prevent Breech Strike benzene hexachloride was less effective and more costly than arsenical preparations. Benzene hexachloride was very effective in preventing Head Strike in rams. A dressing containing boric acid, bentonite, and 10 % citronella oil was very satisfactory for prevention of strike at lamb marking.

Small daily doses (5 g.) of phenothiazine were equally effective against *Oesophagostomum columbianum* whether injected into rumen or abomasum. Phenothiazine sulphoxide was found to have similar anthelmintic properties to phenothiazine itself. Although administration of phenothiazine in salt lick checked an outbreak of HAEMONCHOSIS it could not be relied upon to provide adequate and economical control of helminthiasis. Hexachlorethane and carbon tetrachloride were effective against adult *Paramphistomum* spp. when dosed into the rumen of sheep. Tetrachlorethylene, orthodichlorobenzene, paratertiary butyl phenol, nicotine sulphate, and phenothiazine were not effective. Hexaethyltetrphosphate in doses of 1 and 2 ml. into the rumen produced nicotine-like effects, but was not effective against *H. contortus*. Wheat-germ oil had no anthelmintic effects in sheep. Studies on *O. columbianum* showed that in young sheep the "prepatent" period was 39–58 days, and maximum egg production was reached in 50–80 days after administration of larvae. In older sheep (2–3 years) the corresponding periods were 40–150 days and 77–230 days. These long "latent" periods complicate control measures. The effects of nutrition on HAEMONCHOSIS were studied further. Sheep on the better ration threw off their infestations in 3–39 days (mean 19 days). Of ten sheep on the poorer ration four threw off their infestation in 44–78 days (mean 57 days), while in the other six there was no loss of infestation in 110 days. Studies on "self-cure" were continued. Sheep infected with *H. contortus* were given fairly

heavy doses of infective larvae. The majority threw off the existing infestation within a few days and developed a fresh infestation from the larvae some three weeks later. Loss of the initial infestation was accompanied by an increase in red cells and eosinophiles in the blood, but as the new infestation developed sheep became anaemic again and the eosinophilia disappeared. It now seems probable that "self-cure" seen in the field is caused by intake of a large dose of larvae. (Note: increasing titres of antibody as shown by complement-fixation tests also accompany "self-cure".) Satisfactory antigens for the C.F. test can now be prepared from infective larvae and are better and less variable in potency than antigens prepared from adult *H. contortus*. In sheep carrying *H. contortus* the titre of antibody is enhanced by dosing with larvae. Weekly C.F. tests in a flock used in epidemiological studies have given remarkably constant results during a period of nine months. The alcohol-soluble lipid material of nematodes is an essential constituent of antigen. Studies on *Limnaea brazieri*, intermediate host of the liver fluke of sheep, were continued and dealt with local distribution and effect of toxic materials. A number of compounds, including D.D.T. and benzene hexachloride, were all less toxic than copper sulphate. Extracts of the ti-tree (*Leptospermum scoparium*) were toxic *in vitro*, but had little promise in field tests.

Studies on parasite physiology and toxicology dealt with aerobic metabolism in adult intestinal nematodes, physical characters of haemoglobins isolated from nematodes, ability of helminths to utilize oxygen, mode of action of phenothiazine synthesized from radio-active sulphur, feeding activities of *Nippostrongylus muris*, immediate sources of energy of nematode parasites, and nutrition of parasitism.

In studies on RICKETS IN SHEEP in Tasmania, it was found that sheep wintered on ryegrass-clover pasture with a supplement of hay derived no benefit from a vitamin D supplement, but in sheep wintered on an oat crop there was a marked response to vitamin D.

The work of the Division of Biochemistry and General Nutrition is reviewed in detail. The experimental work of the division has shown that appropriate manurial treatment with superphosphate containing zinc and copper will allow good permanent pastures to be established over extensive areas of light sandy soils of the so-called Ninety-Mile Desert in South Australia. Studies on COPPER DEFICIENCY IN SHEEP led to these more extensive studies on the environment of the animal. Studies on nutrition and wool production show how wool growth is limited by the cystine and methionine contents of the diet. Metabolic studies

deal with utilization of urea, digestion of refractory carbohydrates, absorption of fatty acids from the rumen, intermediary metabolism of fatty acids (phloridzinized sheep, ketone production, blood sugar in lambs and respiration of erythrocytes), and energy metabolism. Studies on vitamin A requirements were continued.

Physiological and tissue metabolism studies investigated the effects of cyanide on tissue respiration, cytochrome oxidase in COPPER DEFICIENCY and arginase activation by manganese, cobalt, and nickel. Observations on CHRONIC FLUOROSIS were continued.

The work on minor elements and animal nutrition covered a wide field including cobalt and copper in the nutrition of rats, copper and molybdenum in the nutrition of ruminants, COBALT DEFICIENCY and the interaction of copper and molybdenum in the field, grazing on pastures dressed with copper and cobalt, copper deficiency and pigmentation of wool, mode of action of cobalt (it is equally effective in all compartments of the stomach, including the abomasum), dried liver supplements and cobalt deficiency, storage of copper and iron in the liver.

Investigations in progress on wool biology included nutrition of the ewe in relation to growth of skin and fleece of the lamb, rate of wool production in relation to food intake, influence of non-nutritional factors on fleece growth, influence of changes in cutaneous blood circulation on growth rate of wool, reactions of sheep to high temperatures and varying humidities and statistical records of distribution of breeds of sheep in New South Wales.

The summer annual, *Heliotropium europaeum*, was found to contain a substance which damages the liver of sheep causing TOXAEMIC JAUNDICE. The importance of molybdenum in restricting uptake and storage of copper by sheep was confirmed.

The physiology of reproduction in sheep was studied. Regular cyclic changes occur in the vaginal contents of ewes with regular oestrous cycles. Change in weight of the uterus in the ovariectomized virgin g. pig following consumption of subterranean clover shows promise of providing a suitable assay for oestrogen. In normal wethers treated with male hormone there was a marked, but temporary, development of the urethral process. Implantation of testosterone propionate increased resistance to "PIZZLE ROT" (POSTHITIS).

Other investigations of veterinary interest include TB. IN CATTLE, CASEOUS LYMPHADENITIS IN SHEEP, toxicity of wheat for stock (relation to lactic acid), chronic toxicity of D.D.T., epidemiological studies on sheep parasites, winter feeding of sheep, "elastrator" technique for lamb

marking, neo-natal mortality in lambs, drought feeding of sheep, DENTAL ABNORMALITIES IN SHEEP, studies on gonadotropins, spermatogenesis in rams (vitamin A), sheep breeding studies (inheritance of POLLEDNESS is specially mentioned), beef production survey, poultry breeding, insect physiology and toxicology, population dynamics of *Musca*, *Chrysomyia*, and *Lucilia*, extensive studies on pastures.

A list of publications for the year is given towards the end of the report.—H. MCL. GORDON.

AUSTRALIA, QUEENSLAND. (1949.) **Annual Report of the Department of Agriculture and Stock for the year 1948-49.** pp. 99. [Items of veterinary interest, pp. 47-48.] Brisbane: A. H. Tucker. 2953

An outbreak of SALMONELLOSIS occurred in bulls which had travelled some distance by rail and road. There were a number of deaths and the following strains were isolated: *S. typhi-murium*, *S. muenchen*, *S. anatum*, and *S. london*. The cattle had acute cellulitis followed by sloughing of lesions which began as abrasions and bruising during the train journey. Other symptoms included diarrhoea, pyrexia, increased respiration rate, general acute distress, and rapid loss of condition.

Numerous outbreaks of FOOT ROT occurred, but the response to intravenous injections of sulphapyridine and sulphamethazine as soluble salts was good. A severe outbreak following dipping in benzene hexachloride appeared to be analogous to foot lameness seen in sheep under similar conditions [see *V.B.* 19. 321].

Several outbreaks of ICTERO-HAEMOGLOBINURIA occurred in young calves. A leptospira was isolated and has produced the disease in calves under laboratory conditions.

Two disturbing features have arisen recently in connexion with immunization of cattle against the "tick fevers", PIROPLASMOSIS and ANAPLASMOSIS. Occasionally susceptible cattle fail to "react" when inoculated with blood from a recently immunized donor. A number of cattle developed a prolonged anaemia after the initial acute reaction had passed and the parasites (piroplasms, anaplasms) had disappeared from the peripheral circulation.

The buffalo fly, *Siphona (Lyperosia) exigua*, has been prevented from spreading south of the Burnett River by spraying cattle with D.D.T. before they move into "clean" country.

Dipping trials against *Boophilus microplus* were carried out with D.D.T., benzene hexachloride, chlordane, toxaphene, and E.605 (diethyl-p-nitrophenyl thiophosphate). At concentrations of 0.5 % D.D.T. many adult and nymphal ticks escaped. Older adults and nymphs were also the

most resistant stages to benzene hexachloride. Chlordane gave excellent kills of all except older adult ticks, and its protective value was considerable. Toxaphene killed all stages of the tick, but its protective value was less than that of chlordane. E.605 was very effective against the younger stages.

The residual effects of D.D.T. dipping are particularly valuable where cattle have to travel through tick infested regions.

Studies on seasonal fluctuations in HELMINTH INFESTATIONS were continued in co-operation with the Veterinary Parasitology Laboratory of the Commonwealth Scientific and Industrial Research Organization. In dairy herds the overall infestation gradually increases until calves are 6-8 months old, then rapidly falls and remains at a low level during the remainder of the period of observation when calves are 10-12 months old. Infective larvae of *Haemonchus contortus*, *Bunostomum phlebotomum*, *Bosicola (Oesophagostomum) radiatum*, and *Cooperia* spp. are present on pastures throughout the year, but it appears that late summer and autumn are the seasons of heaviest infestations. Severe parasitism in dairy calves appears to be associated with poor nutritional standards and the use of small, permanent, overcrowded calf paddocks. *Cysticercus bovis* and *Taenia saginata* are reported.

Aphosphorosis appears to be an important factor in causing temporary STERILITY.

Other diseases of cattle include MASTITIS, T.B., CALF PNEUMONIA, BRUCELLOSIS, BOTULISM, VIBRIONIC ABORTION, BOVINE CONTAGIOUS PLEURO-PNEUMONIA, COCCIDIOSIS, SOLEY'S DISEASE, in which the liver is greatly enlarged and shows neoplastic changes, APHOSPHOROSIS, ST. GEORGE DISEASE, WALLUM DISEASE, and ARSENIC AND LEAD POISONING.

The following plants were listed as causes of POISONING: *Lantana camara*, *Trema aspera*, *Pteridium aquilinum*, *Hoya australis*, *Asclepias* sp., *Alstonia constricta*, *Cestrum parqui*, and ergot on *Paspalum dilatatum*. Evidence is accumulating that GEORGINA RIVER DISEASE OF CATTLE AND SHEEP is caused by ingestion of *Eremophila latrobei*.

Cases of MELIOIDOSIS, a fatal pyaemic disease in sheep, yielded cultures of an organism closely resembling *Pfeifferella whitmori*, the cause of melioidosis of man and rodents in SE. Asia.

Other diseases of sheep mentioned include INFECTIOUS LABIAL DERMATITIS, diseases of the reproductive organs of rams, URINARY CALCULI IN WETHERS, "HUMPY BACK", GEORGINA RIVER DISEASE, FLEECE LIFTING and CORONITIS, TRANSIT TETANY (HYPOCALCAEMIA), VITAMIN A DEFICIENCY and PROTEIN DEFICIENCY in rams, COPPER DEFICIENCY, and BLOWFLY STRIKE. Other studies

on sheep include drought feeding, lowered reproductive rates, climatological survey related to sheep population, drought, and vegetation.

There is no reason to believe that "whitewood" (*Atalaya hemiglauc*) is concerned in the aetiology of BIRDSVILLE DISEASE in horses and some outbreaks of WALKABOUT DISEASE have been investigated where it has been hard to incriminate whitewood. Inquiry is being made into the extent to which STRONGYLE INFESTATION influences the course of these diseases.

Feeding tests with *Gomphrena celosioides* produced a syndrome clinically identical with natural cases of ATAXIA (COASTAL STAGGERS).

Other diseases of horses mentioned include SALMONELLOSIS (*S. typhi-murium*) and ulceration of the oesophagus and cardia.

Single treatments of SARCOPTIC MANGE IN PIGS with benzene hexachloride (0.25 % and 0.125 % γ -isomer) suspensions or chlordane (0.25 %) emulsion applied by spraying so that each pig received about 1 quart of fluid eradicated the infestation.

Other diseases of pigs mentioned include PNEUMONIA caused by *Pasteurella suisepitica*, SALMONELLOSIS (*S. paratyphi*), HELMINTH PARASITISM, VITAMIN A DEFICIENCY.

Diseases of poultry mentioned include FOWL CHOLERA (*Pasteurella*), CORYZA (*Haemophilus gallinarum*), SALMONELLOSIS, PULLORUM DISEASE, BOTULISM, COCCIDIOSIS, TURKEY POX, FOWL POX vaccination of chickens at 3-8 days old, HELMINTHIASIS (*Gongylonema*, *Acutaria*), and INFESTATION WITH THE STICKFAST FLEA (*Echidnophaga gallinacea*), and LEUCOSIS.

An outbreak of NOTOEDRIC MANGE in a koala (*Phascolarctos cinereus*) sanctuary was caused by a mite morphologically indistinguishable from *Notoedres cati*. Many koalas died from a toxæmia before treatment was carried out.

Chemical Laboratory work of interest to veterinarians concerned FLUOROSIS, RENAL CALCULI IN SHEEP, survey of oxalate-bearing edible plants and cyanogenesis in sorghums.

—H. McL. GORDON.

AUSTRALIA. (1949.) 13th Annual Report of the Australian Wool Board for the year ended 30th June, 1949. pp. 32. Items of veterinary interest, pp. 26-31. 2954

The report includes a review of the Board's work in wool promotion and advertisement and the making of films dealing with various aspects of wool production, including disease control.

Technical research is recorded briefly.

The pastoral research activities, carried out with funds derived from a charge on each bale of wool, are described. Most of the work is also

noted in the Annual report of the Commonwealth Scientific and Industrial Research Organization.

FOOT LOUSE INFESTATION (*Linognathus pedalis*) of sheep was eradicated by benzene hexachloride dipping fluids applied as a combined spray and foot bath. Crude benzene hexachloride controlled BODY LOUSE INFESTATION when administered to sheep by mouth, but there were toxic effects.

Insectary trials on prevention of BODY STRIKE BY SHEEP BLOWFLY showed that by spraying the back of the sheep with an emulsion containing 2 % D.D.T. protection was provided for 100 days. Preparations of 2 % chlordane or 0.5 % gamma benzene hexachloride gave 50 days' protection, while 2 % toxaphene or 0.05 % gamma benzene hexachloride gave less than 21 days' protection. Eggs of *Lucilia cuprina* hatched normally on surfaces treated with D.D.T., benzene hexachloride, chlordane or toxaphene, but two hours' contact with wool treated with 0.1 % of these insecticides or with 0.01 % benzene hexachloride was fatal to newly hatched larvae. Sheep which had been sprayed with 1 % D.D.T. or 0.1 % gamma benzene hexachloride were subjected twice weekly to the equivalent of 1 inch of artificial rain without reducing the effects of the insecticides over a period of 64 days.

In studies on anthelmintics, phenothiazine was less effective against *Chabertia ovina* than against *Oesophagostomum columbianum* and it is suggested that the drug may affect *C. ovina* only when they are free in the lumen and not while they are attached. [Note. The report has "feeding" instead of "free".] *Oe. columbianum* (nodular worm) passed with faeces after administration of phenothiazine were still alive. Hexachloroethane dosed into the rumen was highly effective against *Haemonchus contortus*, had some efficiency against *Trichostrongylus* spp., but only very slight efficiency against *Oe. columbianum*. It was also very effective against adult paramphistomes of sheep. [Note. The report mentions cattle, but no tests were carried out with cattle.] Lead arsenate was very effective against *H. contortus*, but not very effective against *Oe. columbianum*.

Studies on immunity to helminths suggested that individual sheep may be inherently more resistant to *Trichostrongylus* spp., and showed that TRICHOSTRONGYLOSIS is seldom serious in sheep over two years of age. The "self cure" phenomenon was induced by dosing infested sheep with infective larvae. The occurrence of "self cure" in the field is probably due to sheep ingesting large numbers of infective larvae at times when weather conditions favour mass development on pastures. The dose of larvae sufficient to induce "self cure" in the majority of sheep sometimes overwhelmed and killed a few of them.

Investigations into the cause of TOXAEMIC JAUNDICE of sheep have established that CHRONIC COPPER POISONING is a cause of the disease known as "yellows". Another cause of "yellows" is consumption of the plant *Heliotropium europaeum*. Long-continued ingestion of the plant results in liver damage. Deaths occur when sheep graze the plant for the second year, and may be delayed until some months after the plant has disappeared from pastures. CHRONIC COPPER POISONING has been seen most commonly on pastures dominated by subterranean clover. A supplement of molybdenum which is useful in controlling chronic copper poisoning is harmful to sheep with liver damage caused by ingestion of *Heliotropium europaeum*.

Other studies on sheep include breeding investigations, skin and wool growth, vitamin D supplements for sheep grazing cereal crops, drought feeding and effect of large rations of wheat (LACTIC ACID INTOXICATION).—H. MCL. GORDON.

CANADA. (1949.) **Report of the Veterinary Director General for the year ended March 31, 1949.** [CHILDS, T.] pp. 55. Ottawa: Edmond Cloutier. 2955

ANTHRAX is not prevalent, but two cattle died from this disease during the year. 60 % of the 8,251,000 cattle in Canada are under the Department's TUBERCULOSIS control policies, and it is hoped that within the next five years the incidence of TB. in the entire cattle population will be one-half of 1 % or less. Of 3,046 herds under supervision for the control of BRUCELLOSIS, 1,795 are now listed as being free from the disease. Under the Brucellosis Free Listed Herd Regulations (1947), all cattle in herds which participate in the scheme are blood tested and reactors are slaughtered; calves between the ages of four and eight months from these herds are vaccinated with strain 19 vaccine.

DOURINE, GLANDERS, and SHEEP SCAB appear to have been eradicated from Canada, and RABIES and SWINE FEVER have not been seen for four years. The eradication of SWINE FEVER is believed to be the result of restrictions on the importation of swine and rigidly imposed laws controlling the feeding of garbage. SCRAPIE was first diagnosed in 1945, but no cases have since been seen. NEWCASTLE DISEASE has appeared on seven premises distributed between Nova Scotia and Saskatchewan.

Two horses were affected with MANGE, and MANGE IN CATTLE remains a troublesome complaint, 25 outbreaks having occurred; all were chorioptic, except three which were sarcoptic.

—G. B. S. HEATH.

CANADA. (1949.) **Department of Agriculture. Report of the Science Service for the year**

ended March 31, 1949. [Reprinted from the Report of the Minister of Agriculture for the year ended March 31, 1949.] pp. 110. Items of veterinary interest, pp. 27-32. 2956

By combining killed *Brucella abortus* with hyaluronidase or so-called "spreading factors", attempts have been made to produce a satisfactory level of immunity to CONTAGIOUS ABORTION. No success has followed the many efforts which have been made along these lines.

COCIDIOSIS in poultry is no longer an important disease, because current methods of control are very effective. PULLORUM DISEASE of chickens has also yielded to control measures, but, in turkeys, it remains a serious problem. Turkey production in Eastern Canada is limited by the prevalence of ENTEROHEPATITIS; in Western Canada, *H. gallinae* is believed not to carry the parasite. NEWCASTLE DISEASE has now appeared in the country.

RHINITIS OF SWINE continues to be an important disease.—G. B. S. HEATH.

SOUTHERN RHODESIA. (1949.) **Report of the Director of Veterinary Services for the year 1948.** [LAWRENCE, D. A.] pp. 17. Salisbury: Rhodesian Printing & Publishing Co. Ltd. 2957

There were 19 Veterinary Surgeons on the staff. The Veterinary Research branch has been combined with the Veterinary Department under the Director of Veterinary Services. Four professional officers resigned during the year. At the end of the year there were six vacancies for Veterinary Surgeons, five on the field staff and one on the research staff. There were 62 Animal Health Inspectors on the staff at the end of the year, but there were 11 vacancies on the permanent establishment. One V.O. and three A.H. Inspectors were loaned to Bechuanaland Protectorate to deal with F. & M. DISEASE.

MASTITIS is one of the main causes of loss to the dairy farmer. Improvement in milking methods and general hygiene is essential. For control of ANTHRAX animals in each centre of infection are inoculated with vaccine for three years in succession with good results. Outbreaks occurred in Salisbury District (17 deaths), Fort Victoria (5 deaths), and Buluwayo (one). Reports indicate an increase of TB. in dairy herds. A pilot test was to be made early in 1949 in the Umtali district. In 4,819 blood tests of dairy cows for CONTAGIOUS ABORTION 8.5 % were infected. African-owned cows tested gave 4 % reactors. BLACKLEG is dealt with by the farmers and no official records of outbreaks is kept.

The drug dimidium bromide has been used successfully on large numbers of TRYPANOSOMIASIS infected cattle.

One case of TRICHOMONIASIS was diagnosed in

a heifer imported from Great Britain while in quarantine.

The incidence of PIROPLASMOSIS and ANAPLASMOSIS has increased.

The EAST COAST FEVER (*Theileria parva* infection) position is very satisfactory. Melsetter District is now free from the disease. In Chipinga District there have been no new cases since August 1947. In Salisbury District a case was diagnosed on 18 March 1948, i.e., 10 months after the last case on 7 May 1947. Outbreaks of THEILERIASIS were reported from Fort Victoria district (1), Salisbury district (2), Lomagundi (9), Marandellas (2), Chipinga (1).

Outbreaks of FOOT AND MOUTH DISEASE occurred in Fort Victoria, Umtali, and Chipinga districts. Control was by quarantine and inoculation of "in-contacts".

A few mild cases of LUMPY SKIN DISEASE were reported.

EPIDIDYMITIS-VAGINITIS has spread considerably during the year, mainly in the Salisbury district (26 outbreaks of the total of 44). Control is by quarantine; infected bulls are killed, the cows are treated by vaginal douching and artificial insemination is carried out to maintain the calf crop. Some outbreaks appear to have been spontaneous, there being no apparent connexion with previous outbreaks.

HEARTWATER is reported to be increasing in Bulawayo District. In one outbreak in Fort Victoria District over 40 animals died. Control was by dipping and hand dressing. The disease does not occur in any other district.

HELMINTH INFESTATION causes heavy losses in all districts owing to inadequate and irregular dosing by farmers. Liver fluke caused condemnation of 34 % of bovine livers at the supervised abattoirs. In Salisbury 47 % of adult cattle slaughtered were infected with liver fluke.

There was a big reduction in the number of cattle slaughtered. In Salisbury 15,265 fewer cows were slaughtered and there were fewer condemnations for emaciation—365 as compared with 3,122 in 1947. There was an increase in the numbers of beef carcasses infected with "MEASLES" (*Cysticercus cellulosae* infection) in the Bulawayo abattoir to 1.45 % of animals slaughtered as compared with the 0.37 % in Salisbury. Lack of proper hygienic measures of sanitation on the farms is the cause of this.

Animals slaughtered for export at the four main centres were 114,068 cattle, 32,112 pigs, 25,287 sheep and goats.

The Veterinary Research Department was combined with the Veterinary Department on 1 April 1948. The work consists mainly of routine diagnostic examinations and tests, some

vaccine production, and supplying various imported vaccines and drug remedies for the eradication of internal and external parasites.

COCCIDIOSIS is dealt with by giving sulphamethazine in the drinking water. FOWL TYPHOID causes heavy losses and preventive inoculation is not giving satisfactory results. HELMINTH INFESTATION is being dealt with by dosing with pure carbon tetrachloride followed by magnesium sulphate, 1 lb. per gal. of drinking water in place of drinking water 6 hours after. Artificial insemination was introduced as an emergency disease control measure against the spread of EPIDIDYMITIS-VAGINITIS.

Very little research work could be undertaken owing to there being insufficient staff to carry on anything more than routine diagnostic services and vaccine production. A total of 7,816 smears were examined. These were mainly to detect EAST COAST FEVER infection. The following diseases were detected during the year: BOVINE PIROPLASMOSIS (155); REDWATER in pigs (1); ANAPLASMOSIS (229); SPIROCHAETOSIS (7); TRY-PANOSOMIASIS (*T. congolense* infection) (124); *T. vivax* (9); *T. brucei* (1); ANTHRAX (8); BLACKLEG (26); THEILERIASIS (71); small piroplasms (probably *Theileria mutans*) (2); *Theileria parva* (2); *Babesia canis* (12); EQUINE BILIARY FEVER (6).

In 4,819 serological tests for CONTAGIOUS ABORTION there were 8.56 % positive reactions and in 2,893 tests for BACILLARY WHITE DIARRHOEA and FOWL TYPHOID there were only 13 positive reactions.

Vaccine production included 179,791 doses of BLACKLEG vaccine and 4,368 doses of Calf Paratyphoid vaccine. The following vaccines were imported from Onderstepoort Veterinary Laboratory, Union of South Africa—AFRICAN HORSE SICKNESS vaccine, BLUETONGUE vaccine, CONTAGIOUS ABORTION vaccine.

Immunization of imported stock against REDWATER and GALLSICKNESS is carried out by inoculation of non-virulent strains of anaplasms and babesia. A "bleeder", i.e., an animal carrying the strains of *Babesia bigemina* and *Anaplasma centrale*, is used to provide blood containing these parasites. The difficulty is to control the reaction to these injections of infected blood. Trypanblue now being used is unreliable; phenamidine although slow in action does protect reactors, but does not sterilize the reacting animal's blood and is therefore inferior for treating animals with natural infection or affected by severe reactions after inoculation. A combination of both drugs is used in cases where the reaction is severe.

1,417 cattle with TRY-PANOSOMIASIS were treated with 30 % solution of dimidium bromide freshly prepared in doses of 1 ml. per 50 lb. live weight. Results were satisfactory. Losses were

very considerably reduced in the next two months and appear to have ceased since.—J. A. GRIFFITHS.

GOLD COAST COLONY. (1947.) Report on the Department of Animal Health for the year 1945-46. [STEWART, J. L.] pp. 8. Accra: Government Printing Department; London: Crown Agents for the Colonies. [1s.] 2958

The Department was very much understaffed throughout the year. The first African to qualify M.R.C.V.S. (Richter, W. A. G.), an African Veterinary Assistant of the Gold Coast Veterinary staff, rejoined the staff as a Veterinary Superintendent. Other members of the Department's African staff have been employed in performing technical duties normally carried out by European Officers.

There were more cases of ANTHRAX reported. Spore vaccine from Vom Laboratories, Nigeria, is used to control outbreaks. In one outbreak carcasses were eaten by villagers, 14 of whom became infected, and six died, four recovered and four "went to bush".

A severe outbreak of PIG TYPHOID (*Salmonella cholerae-suis* infection) occurred at the Government farm at Sekondi.

Two districts were declared infected with EPIZOOTIC LYMPHANGITIS (*Cryptococcus farciminosus*).

There was no outbreak of BOVINE CONTAGIOUS PLEURO-PNEUMONIA reported in the Northern Territories. It is claimed that the annual vaccination (256,000 cattle) gave general protection. In the coastal areas of the Gold Coast Colony vaccination is said to protect adults, but not the young cattle. The inoculations are carried out twice a year with a younger generation culture than is used in the Northern Territories but outbreaks still occur in this area. (The unreliability of this method of control has been obvious since its inception as outbreaks of the disease occur even among vaccinated cattle when exposed to infection, whatever the state of the animals may be.) Conditions in the coastal area of the Gold Coast, it is emphasized, are favourable to the spread of infection, particularly in the dry season, as shortage of grazing and water is causing concentrations of the herds when they are at their nearest to emaciation, a result of semi-starvation.

Phenanthridinium 1553 was used experimentally in the treatment of TRYPA NOSOMIASIS in 300 cattle, some of them artificially infected. All these animals recovered and no relapses had been recorded. The drug was effective against *T. congolense* infections.

46,730 young cattle were immunized against RINDERPEST with a mortality of only 1% even though it is claimed that the local cattle are much more susceptible than those of Nigeria where

higher mortality rates prevailed while methods similar to those of the Gold Coast were being used.

CONTAGIOUS PNEUMONIA OF SHEEP was eliminated by penning the sheep in the open on grassland, and frequently changing the runs. Production of sera and vaccines at Pong-Tamale Veterinary Laboratory included anti-RINDERPEST vaccine and serum, 623 and 7,453 litres respectively. BOVINE CONTAGIOUS PLEURO-PNEUMONIA culture vaccine 317,195 doses. (Sierra Leone was supplied with 22,440 doses.) Goat virus experiments using Nigerian goat virus have not been successful. The Gold Coast cattle react severely and the use of serum with the goat virus may block out any reaction and leave many of the animals still very susceptible. The old method used in the Gold Coast in which vaccine inoculation is followed later by virus/serum injections is still considered safer and more reliable.

SWINE FEVER was suspected at the Pokoase farm near Accra and at Tamale farm.

Details are given of the general position of animal husbandry, but there are no new points of veterinary or general interest.

There was a 50% reduction in the number of cattle imported and all these were for the Army. Over 92,000 sheep and goats passed through the quarantines, but many others entered by other routes. The pig industry has developed and is helping in maintaining meat supplies.

—J. A. GRIFFITHS.

NIGERIA. (1949.) Annual Report on the Agricultural Department for the year 1947. pp. 83. Lagos: Govt. Printer. 9d. [Items of veterinary interest pp. 9-12.] 2959

This report concerns some aspects of animal husbandry under the control of the Agricultural Department in Nigeria. Cattle auction statistics and those for milk and butter production in dairies administered by Africans are given. There was a revival in demand for bacon pigs and some attention was given to the breeding of these and to the controlled breeding of local indigenous cattle. CONTAGIOUS ABORTION presents a serious problem and there were many deaths from HEARTWATER. The rains were reported as inadequate. In the control of TRYPA NOSOMIASIS, the breeding of pure West African Shorthorn types was to be discontinued. The N'Dama breed of cattle was believed to be superior to others in tolerance to TRYPA NOSOMIASIS.—S. BRIAN KENDALL.

NORTHERN RHODESIA. (1949.) Veterinary Department. Annual Report for the year 1948. [Hobday, J.] pp. 22. Lusaka: Govt. Printer. 1s. 2960

The year 1947 was one of low rainfall and serious failure of crops. Cattle were moved to less

affected areas in an effort to minimize losses which in fact proved surprisingly low. Drought occurred also in the neighbouring territories of Bechuanaland and Southern Rhodesia and cattle were imported into Northern Rhodesia for slaughter. There was an overall shortage of beef and the bulk of the butter requirements were imported from Kenya.

The disease position is reported as satisfactory. No outbreaks of BOVINE CONTAGIOUS PLEURO-PNEUMONIA, RINDERPEST, or LUMPY SKIN DISEASE are known to have occurred, while EAST COAST FEVER was confined to two small areas. For the control of TRYPANOSOMIASIS more plentiful supplies of phenanthridinium drugs were available, and in the field single injections of a 3 % solution of dimidium bromide were remarkably effective and no adverse effects were noted. In particular PHOTOSENSITIZATION was not noted. Benzene hexachloride (gammexane) dips were investigated under controlled conditions, freshly made solutions were found to be infinitely superior to arsenical dips and to be fully effective against all types of tick in all instars.—S. BRIAN KENDALL.

BERMUDA. (1948.) **Report of the Department of Agriculture for the year 1948.** pp. 34. [Includes Rept. Govt. Veterinary Officer, pp. 25-30.] 2961

Farming in the Colony continued to shrink in spite of the strenuous efforts of the Board of Agriculture to stem the tide of recession and is now at its lowest ebb in the history of the Colony.

The seventeenth Agricultural Exhibition was held in 1948, but the Agricultural Station is very poorly equipped to stage these exhibitions.

The report deals mainly with questions of crop husbandry, but it includes the report of the Veterinary Officer. All dairy herds are inspected annually to re-grade them and to suggest future improvements. MASTITIS would appear to be a major problem in the Colony. BOVINE TB. is controlled by the tuberculin testing of all cattle on the islands twice a year. Out of 1,171 cattle tested during the first part of the year, no reactions were noted and out of 1,196 tests in the second half, one reactor was detected, giving a percentage of reactors throughout the year of 0.05 %. BRUCELLOSIS is dealt with by the vaccination of cattle between the ages of 4-8 months with strain 19 vaccine. Between 60 and 90 days after vaccination a blood test is carried out to ascertain whether the vaccination has been successful. In unsuccessful cases the calf is re-vaccinated and tested again. SWINE FEVER is controlled by the inoculation of all pigs with swine fever anti-serum.

Meat inspection is a duty of the veterinary department and a total of 2,978 carcasses were examined during the year. Condemnations were

very few and for three months of the year there were none at all.—D. S. RABAGLIATI.

U.S.A. MASSACHUSETTS. (1948.) **Annual report for the fiscal year ending June 30, 1948, Massachusetts Agricultural Experiment Station.** *Bull. Mass. agric. Exp. Sta.* No. 449. pp. 80. Items of veterinary interest, pp. 70-76. 2962

Following examination of samples of milk in the MASTITIS Testing Laboratory, group segregation is recommended. Group 1, Negative, Group 2, Positive, for mastitis not caused by *Str. agalactiae*, i.e., *Staphylococci*, *Str. uberis*, *Str. dysgalactiae* or coliform organisms; Group 3, Positive for *Str. agalactiae*. Tests of 4,607 samples from 1,166 head of cattle gave a distribution of 691 in Group 1, 236 in Group 2, and 239 in Group 3. *Str. agalactiae* infections in 1,157 head, representing 75 herds, was 48 %. Herds of under 20 cows had 41 % infected as compared with 52.5 % in larger herds.

In 1,272,547 blood tests of fowls, 0.1 % were positive for PULLORUM DISEASE. 24,564 tests of blood from birds other than fowls gave no positive reactions. The non-reacting flocks represented 97.20 % of all birds tested. *Salmonella pullorum* antigenic forms are being investigated to determine the practical significance of form variation as it affects antigenic response and agglutination reactions.

4,627 specimens were received by the diagnostic service. These included INFECTIOUS BRONCHITIS (150); NEWCASTLE DISEASE (115); TUMOURS (110); COCCIDIOSIS (82); FOWL PARALYSIS (57); Respiratory Infections not diagnosed (113); Avian TYPE TB. was diagnosed on two premises, FOWL CHOLERA (*Pasteurella*) on 18, and FOWL TYPHOID on 20.

Tests were also made of 300 flocks for NEWCASTLE DISEASE; 115 were positive and 185 negative. 36 flocks were found to be infected with both INFECTIOUS BRONCHITIS and NEWCASTLE DISEASE. Both diseases are very prevalent in Massachusetts.

In 1947 NEWCASTLE DISEASE immunization was initiated and developed as a State-wide vaccination programme. Tests show that Newcastle disease virus in infertile eggs can remain viable for at least 29 days at 99° F. in an incubator. (Wet bulb reading 90° F.).

Pox was observed in two canary flocks. Mortality was 35 % and 65 % respectively. Vaccine of canary origin was found of value in dealing with the outbreak. The 339 turkey specimens included PARA-TYPHOID, COCCIDIOSIS and ENTEROHEPATITIS most frequently; NEWCASTLE DISEASE in two outbreaks resulted in a mortality of 40 % among poults during a period of four weeks. Control measures against INFECTIOUS BRONCHITIS of fowls

were applied to 263 flocks with satisfactory results. 177 flocks were tested for immunity to INFECTIOUS BRONCHITIS and 133 of them were found to be immune, 27 susceptible and 17 uncertain.

A severe CONJUNCTIVITIS AND KERATITIS IN CHICKENS 2-18 weeks of age is giving increasing trouble. Aetiology of the condition is unknown.

Broodiness in poultry cannot be completely eliminated by selective breeding. 80 actively laying hens of different ages of a non-broody line were each injected with 50 I.U. of prolactin to test for broody inheritance. Egg laying stopped within two days in most of them and was not resumed for 15-20 days. None of the birds became broody.

A new sex linkage relationship was discovered in a strain of White heavy Plymouth Rocks. This autosomal dominant plus the factor for silver allows the production of 100 % white offspring when white males are mated with Rhode Island Red females. The reciprocal mating gives red females (with no black plumage) and white males.

—J. A. GRIFFITHS.

U.S.A. MICHIGAN. (Undated.) **Report of the School of Veterinary Medicine, Michigan State College, East Lansing, 1947.** [GILTNER, W.] pp. 62. 2963

The school is in the process of changing over from a short course which was introduced during war-time to the normal peace-time veterinary course.

MASTITIS in cows remains a serious problem. A real effort is being made to control BRUCELLOSIS in the State, and this disease is now becoming less prevalent. SHIPPING FEVER OF CATTLE and SWINE FEVER have not caused serious difficulties during

the year, but their continued presence is causing anxiety. One case of EQUINE ENCEPHALOMYELITIS was reported during the year.

Sulphathiazole is recommended for treatment of PNEUMONIA IN LAMBS. [The evidence on which this recommendation is based is rather scanty.] Of seven lambs which died of PNEUMONIA, six had patent foramen ovale.—G. B. S. HEATH.

U.S.A. MICHIGAN. (1948.) **Report of the School of Veterinary Medicine, Michigan State College, East Lansing, 1948.** [BRYAN, C. S.] pp. 75. 2964

Attempts to eradicate MASTITIS have not been successful; the incidence appears to be increasing. The campaign to eradicate BRUCELLOSIS has been continued and a new vaccine, Brucella-M vaccine, is being used in place of strain 19. All reactors to the agglutination test must be tattooed before being offered for sale, but cattle under 20 months of age may be exhibited without test if properly recorded as vaccinated between the ages of four and eight months.

SWINE FEVER, EQUINE ENCEPHALOMYELITIS, and RABIES, although still present, are only minor problems. NEWCASTLE DISEASE continues to be very prevalent.

In three of four lambs which died of PNEUMONIA, the foramen ovale was patent. More evidence was obtained to show that sulphathiazole is an effective remedy for PNEUMONIA IN LAMBS. Investigations are being undertaken on "STIFF LAMB" DISEASE, causes of deaths among young lambs, LISTERELLOSIS IN SHEEP, (*Erysipelothrix* (*Listeria monocytogenes* infection) and the influence of cobalt on the haemoglobin levels of ewes and lambs.—G. B. S. HEATH.

BOOK REVIEWS

ILIEV, T. (1948.) [A students' textbook of veterinary epidemiology and prophylaxis.] pp. 688. Sofia: L. Karavelov. 2965

The text is divided into four main parts. The first, covering half the book, is entitled Epizootology and deals with infection. The others are Prophylaxis, Therapy, and Hygiene, and each part is subdivided into numerous sections. The field of veterinary science is fairly well covered. The book is mimeographed in Cyrillic characters, paper covered and unbound.—F. A. A.

MAISIN, J. [Professor at the University of Louvain and Director of the Louvain Cancer Institute.] (1948.) **Cancer. I. Hérité, hormones, substances cancérogènes. [Cancer. I. Heredity, hormones, carcinogenic substances.]** pp. 248. Fr. 84. 2966

(1949.) **Cancer. II. Radiations, virus, environment. [Cancer. II. Irradiations, virus, environment.]** pp. 306. Tournai, Paris: Casterman. Fr. 120. 2967

The author has undertaken the tremendous task of reviewing the literature on cancer from the very earliest days to the year 1947. He has produced a panoramic view of the subject which succeeds in being at once too long and too short. However, he has attained his object of indicating the directions along which modern cancer research is developing. This book is not for the cancer specialist, but for those scientifically educated persons who are interested in cancer.

In the bibliography the references are grouped under the chapter and sub-chapter headings, which is convenient, but it would have been more helpful had the references been arranged in alphabetical

order rather than in the order in which they occur in the text.—I. W. JENNINGS.

KARSNER, H. T. [M.D., LL.D. Medical Research Advisor, Bureau of Medicine & Surgery, U.S. Navy.] SANFORD, A. H. [M.D. Prof. of Clinical Pathology, University of Minnesota (The Mayo Foundation).] [Edited by.] (1950.) **The 1949 year book of pathology and clinical pathology.** pp. 543. Chicago: The Year Book Publishers. \$4.75. **2968**

This volume is one of a series of year-books which have been published continuously since 1900. All the journals received by the editors during 1949 have been reviewed, and selected papers were abstracted for inclusion in the year-book.

While it was obviously impossible, in a volume of this size, to cover adequately all current advances in the subject, a very large number of papers have been reviewed. The abstracts in general are models of comprehensiveness; no tendency to sacrifice clarity in order to achieve greater numbers is apparent. Plates and tables are included where these are necessary for complete understanding of the paper. Indexing and presentation are good.

The book provides an easy method of keeping abreast of main advances in the subject, and would be of value to the general practitioner as well as to the specialist.—G. B. S. HEATH.

JURNÝ, F. (1949.) *Veterinární chirurgie.* [**Veterinary surgery.**] pp. 842. Brno: Studentská organisace čs. veterinárních mediků. Kčs. 900. **2969**

This text book of veterinary surgery in large and small domestic animals and poultry consists of three main parts dealing with general surgery, special regional surgery, and surgical technique. There are 598 good illustrations, mostly drawings. Binding, paper, and print are good. This is a good book and will be of value to students as well as to practitioners.—E. G.

VICARD, A. (1950.) *Les laparotomies chez les bovins.* [**Bovine laparotomy.**] pp. 56. Paris. Vigot Frères. 1st Edit. **2970**

This booklet has been written by a veterinary practitioner enthusiastic enough to write about his experiences in bovine and equine surgery.

He describes rumenotomy, tapping of the pericardium, reduction of intestinal invagination and displacement, caesarian section and castration, all in cattle, except male castration which refers also to horses.

The author's technique is of the simplest character and nothing approaching aseptic technique is attempted and it is clear that he owes much to sulphanilamide to ward off wound sepsis.

Nevertheless, the methods which are described are certainly workmanlike and suitable for use without skilled help, and indicate what can be attempted in ordinary country practice.—J. E.

KUHN, W. R. (1950.) *Die Blut- und die Plasma-Transfusion bei den großen Haustieren.* [**Blood and plasma transfusion in large domestic animals.**] pp. 108. Hannover: M. & H. Schaper. DM. 5. **2971**

This small book is written by the Director of the abattoir at Stadthagen. The author contributed several articles on blood transfusion in large animals between 1932–1936.

The objects of the book are to describe the indications for transfusion, the dangers which have to be avoided and the techniques used. It is surely unnecessary to devote a short chapter to refuting the suggestion, first posed by Robert Boyle in 1660, as to whether transfused blood was capable of affecting the genetic characters of the recipient.

After an introductory chapter devoted to the composition of blood and the effects of transfusion there is a longer section on the choice of donors and the dangers of transfusion; this includes data on the blood groups in horses and cattle.

Almost half of the book is devoted to the technique of transfusion, including the description and illustration of the author's chromium-plated blood container which was designed to reduce the risk of coagulation by providing a smooth surface and free circulation of blood during transfusion.

Taking the blood volume of the horse or ox as 30 l. the author considers 6 l. as the maximal volume of blood for transfusion and 3 and 1.5 l. as medium and small transfusions respectively. Repeated small transfusions are preferable to a single massive transfusion. The close proximity of the jugular vein to the heart is thought by the author to account for the undesirable after-effects which often follow rapid transfusion by this route. Very slow transfusion is indicated in the ox when the blood is given into the jugular vein: if an artery is accessible, as in a wound, the blood should be given by that route. It is suggested that transfusions are best given first thing in the morning. Transfusion of citrated whole blood and citrated or heparinized plasma is also discussed.

For the practitioner, K. considers that citrated or heparinized blood or plasma is the method of choice and that the apparatus which he has designed is entirely suitable for this purpose.—E. G. WHITE.

RAMON, G. (1950.) *Le principe des anatoxines et ses applications.* [**Anatoxins and their applications.**] pp. 229. Paris: Masson et Cie. Fr. 800. **2972**

This book is dedicated to the veterinary

profession and the memory of Emile Roux and represents a historically important personal review of the author's own work in the field of practical immunology.

It starts with an account of the discovery of the famous flocculation reaction bearing the author's name and then proceeds to show how this simple *in vitro* reaction in conjunction with his introduction of the non-toxic, yet still antigenic, "anatoxins" connoted the dawn of a new era in immunology. Outside France anatoxins became known as "toxoids". R. points out that this name was originally coined by Ehrlich for a hypothetical substance with properties diverging from those of his "anatoxins". He refutes immunizations according to the methods of Jenner and Pasteur and demonstrates that equally high titres—equivalent to as good a protection from disease—may be obtained with the completely innocuous "anatoxins", "anavaccines" and "anaviruses" as with the dangerous toxins, attenuated living cultures or killed virus preparations. The necessity of repeated injections and the importance of the now well-established "booster" dose is stressed (*cf.* Glenny's primary and secondary response).

The successful campaign against diphtheria and tetanus based mainly on his pioneer work is followed in most countries all over the world and is well documented with condensed quotations from reports during peace and war. The use of adjuvants and the advantage of multiple immunization—well established during the Second World War—is discussed at length. The author's experience with the preparation of therapeutic sera does not support the concept of "competition of antigens". Arguing from this special instance he negates emphatically and somewhat arbitrarily such a possibility during any immunization [see, however, DOERRER & BERBER, (1922.) *Biochem. Z.* 131. 13; and LANDSTEINER (1945)].

The use of staphylococcal "anatoxin" in human and veterinary practice is advocated, based on reports from its use in France as well as Belgium, Italy, Switzerland, and Spain. The less satisfactory results obtained in England and the U.S.A. are attributed to too low dosage and insufficient control in the making of the toxoid. R. recommends concurrent treatment with antibiotics and even prefers the crude culture filtrates to the pure preparations because of their content of enzyme, etc., which, in his opinion, helps in the control of localized abscesses. There is an interesting chapter of the author's more recent work on the successful immunization of cattle against foot and mouth disease by means of an "anavirus" preparation, with comments on protection by circulating antibodies *versus* non-specific cell stimulation.

The success of supplementing passive im-

munization by serum therapy with active immunization with the specific "anatoxins" in cases of acute infections is discussed.

Practical examples are given of courses of immunization in horses with diphtheria and tetanus toxoids. Additional injections of toxins are deprecated.

The book is well documented with references to the author's own and related original papers, but suffers from a somewhat argumentative and sometimes repetitive exposition. It finishes with a chronological bibliography of some 600 papers published by the author and his collaborators, but there is no alphabetical index. The publication of two further books in the same field is announced.

—R. FRIEDMANN.

HOARE, E. D. [M.D.; Bacteriologist to Redhill County Hospital, Edgware.] (1949.) **The sulphonamides in general practice.** pp. 90. London: Staples Press Limited. New York: Staples Press Inc. 1st Edit. 5s. 2973

This small monograph is a companion to the same publishers' "penicillin in general practice" and comprises in an easily written, succinct style and format, all the essentials the general practitioner requires regarding sulphonamides.

The author discusses the limitations, properties, mode of action, and toxicity of the sulphonamides. The principles of treatment are outlined and various preparations given, including formulae, general properties, and estimation of the compounds. The local use of sulphonamides is discussed and their properties compared and contrasted with those of penicillin. The book is complete to 1949 and includes information on the solubilization of sulphonamides (*e.g.* sulphathiazole) and the later combination of three sulphonamides (sulphathiazole, sulphadiazine and sulphamerazine) to give the same activity with lower renal toxicity.

—MALCOLM WOODBINE.

CLARKE, J. J. [M.A., Barrister at Law.] (1949.) **Introduction to public health law.** pp. 138. London: Cleaver-Hume Press Ltd. 12s. 6d. 2974

The book is—as one would expect from its title—a legal compilation of the Acts and Orders relating to Public Health and deals almost exclusively with England and Wales. There is very little concerning veterinary legislation; in fact one cannot help feeling that a good deal is left out that might usefully have been included.

A list of Public Health legislation from 1848–1948 is appended, but the Agriculture Act of 1937 is not mentioned, nor are the Milk (Special Designation) Orders as the book was written in 1948.

—D. S. RABAGLIATI.

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The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education, and other aspects of veterinary science.

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